AUG 27 1936

**Pharmacists Have Responsibilities of Service and Also Duties Which Include Making the Public Acquainted with Pharmacy, Its Mission and Its Part in the Life of the State and Nation—the National and State Pharmaceutical Association Meetings Present Opportunities.**

Vol. XXV, No. 8 AUGUST, 1936

# JOURNAL
## OF THE
# AMERICAN PHARMACEUTICAL ASSOCIATION

TRADE MARK

## CONTENTS


Frontispiece and Sketch—John W. Slocum ..... 669
Editorial:
The Value of Exhibits ..... 670
The Story of Life ..... 670
Scientific Section:
Studies on Poplar Bud—Bruch and Wirth ..... 672
Monarda Pectinata, Nutt., a Phytochemical Study—Burt ..... 682
Thallium. XIII. Symptoms and Systemic Action of Cattle—Ward ..... 687
The Preparation and Physiological Properties of Some 2-Phenyl-4,5,6,7-Tetrahydro-Indazolones—Lee and Christiansen ..... 691
The Absorption of Certain Drugs from the Human Skin—Bliss, Jr. ..... 694
The Vehicle Value of Syrup of Cherry, N. F. VI—Fantus and Dyniewicz ..... 701
The Early Days of Pharmacy in the West—Moore ..... 705
A Limited Enrolment Selective Plan—Bliss, Jr. ..... 715
The Department of the American Association of Colleges of Pharmacy:
The Future of Pharmacy—Wulling ..... 719
The Cultivation of Tea in the Pacific Northwest—Fischer and Johnson ..... 724
Association Business ..... 727
Report of the Treasurer of the American Pharmaceutical Association, January 1 to June 30, 1936 ..... 730
Editorial Notes ..... 732
Obituary ..... 734
Book Notices ..... 736
Associations ..... 737
Pharmaceutical Abstracts ..... 329–368
Advertising—Cover Pages 2, 3 and 4 and pp. I–XVI.


Published Monthly by the American Pharmaceutical Association: Office of Publication, 20th & Northampton Sts., Easton, Pa. Editorial Office, 2215 Constitution Ave., Washington, D. C. Annual Subscription, $4.00; Canada, $4.35; Other Foreign, $4.50; Single Numbers, 35 cents; Canada, 40 cents; Other Foreign, 50 cents.

THE 84th ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION WILL BE HELD IN DALLAS, TEXAS, AUGUST 24–29, 1936. Hotel Adolphus, Headquarters.

Local Secretary, Walter D. Adams, Forney, Texas.

The 1936 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conference of Pharmaceutical Association Secretaries, of the Pharmaceutical Law Enforcement Officials and the Plant Science Seminar will also be held in Dallas, Texas.

Entered as second-class Matter, January 23, 1917, at the Post Office at Easton, Pa., under the act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103. Act of October 3, 1917; authorized July 10, 1918.

# HOLADIN

**An Extract of the Entire Pancreas Gland**

Holadin has long proved a definite resource in pancreatic disorders, diseases associated therewith. Holadin is put up in powder in 1 oz. vials, no "directions;" as commonly prescribed, the pharmacist may readily attach the usual prescription label.

**FAIRCHILD BROS. & FOSTER**
**New York**



## APPLICATION FOR MEMBERSHIP
IN THE
## American Pharmaceutical Association

**Approving the objects of the American Pharmaceutical Association, I hereby apply for membership in the Association and subscribe for the "Journal of the American Pharmaceutical Association," and enclose $5.00 as annual membership dues, $4.00 of which is for a year's subscription to the Journal.**

**Name in Full**.....
*(Write or print name in full—Initials are not sufficient)*

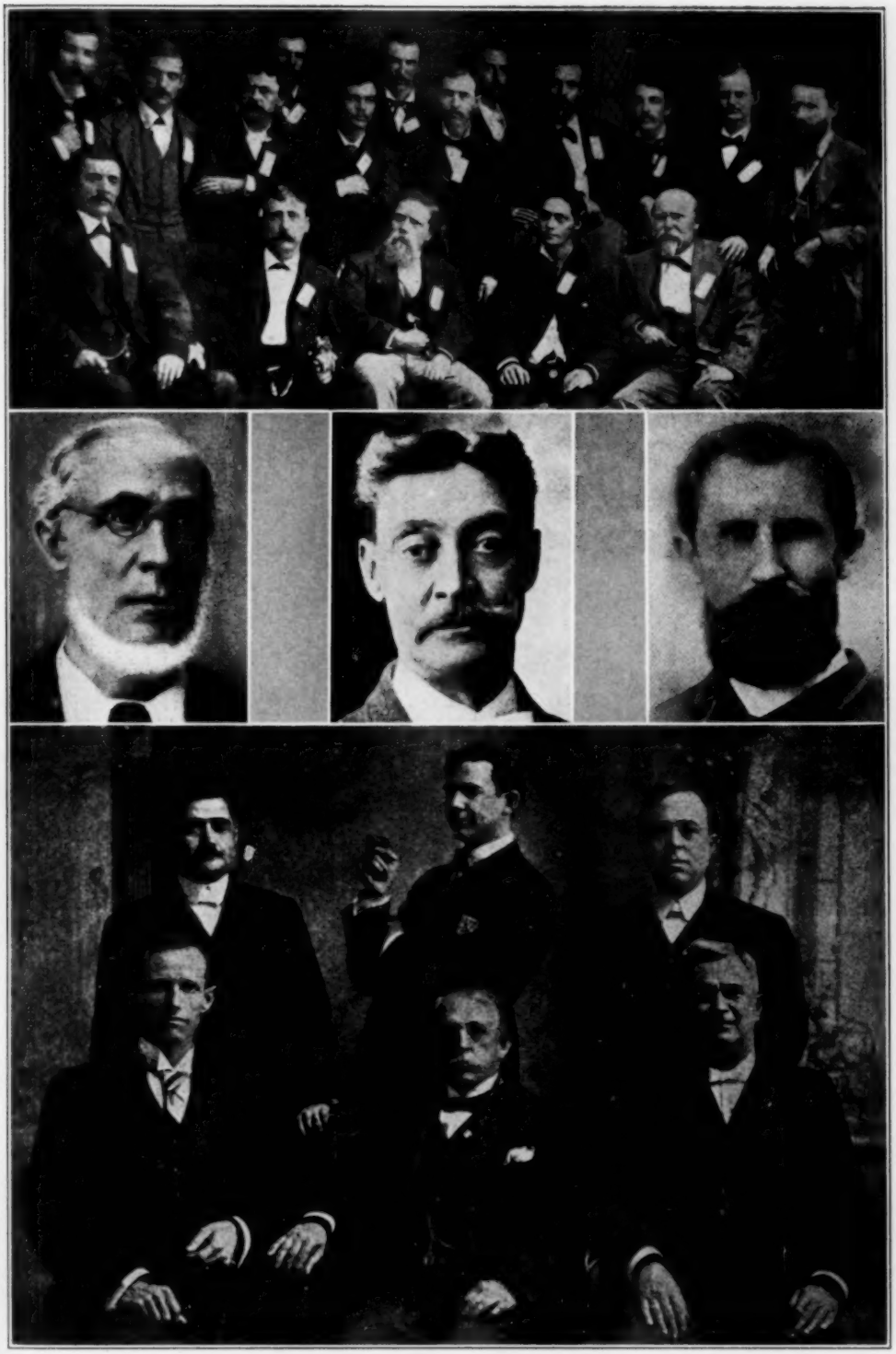
**Number and Street**.....

**Date**..... **Town**..... **State**.....

**Paid $**..... **No.**.....

This application with the first year's payment of $5.00 may be sent to the Chairman of the Membership Committee, the Secretary or any officer of the A. Ph. A.

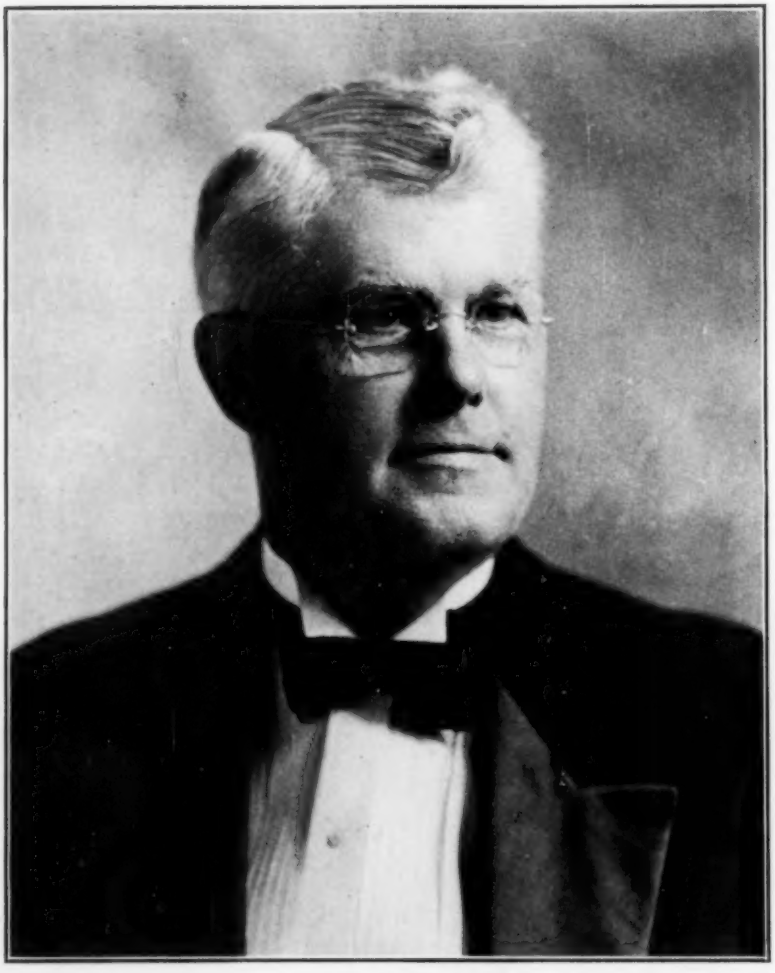
**E. F. KELLY, Secretary,**
**2215 Constitution Ave.,**
**Washington, D. C.**



TEXAS PHARMACEUTICAL HISTORY.

Top—Early meeting of Texas Pharmaceutical Association members. Second group, left to right: F. J. Kalteyer, an early San Antonio pharmacist; L. Meyers Connor, first president of Texas Pharmaceutical Association; and R. Voelcker, its first secretary.

Lower group, first members of Texas Board of Pharmacy, 1907. Courtesy of Texas Druggist, Golden Anniversary Texas Pharmaceutical Association. See page 671.



J. W. SLOCUM.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. XXV AUGUST, 1936 No. 8

## THE PRESIDENT OF THE CONFERENCE OF THE PHARMACEUTICAL ASSOCIATION SECRETARIES.

John W. Slocum, the son of George P. Slocum, of New York State, was born in Adair County, Iowa, August 23, 1874; his mother was a native of Connecticut. The family settled in Iowa about seventy years ago. John attended Fontanella, Iowa, High School and, later, graduated from Simpson College, Indianola. In 1891 he was registered as pharmacist.

Mr. Slocum operates a pharmacy in Des Moines; he has been a member of Iowa Board of Pharmacy for the past ten years and secretary of Iowa Pharmaceutical Association for thirteen years. He is actively interested in the promotion of professional relations of medicine, dentistry and pharmacy and in that connection of coöperation through sectional meetings in Iowa, of individual members of these professions and of the representative bodies. In 1934 he was president of Midwestern Conference of Pharmaceutical Associations. He is a former chairman of the House of Delegates and presided at the Madison meeting of that organization, and is now the president of the Conference of the Pharmaceutical Association Secretaries. Mr. Slocum is a secretary of the Iowa Fair Trade Committee and corresponding secretary of the Iowa Veteran Druggists' Association, and is a member of the National Association of Retail Druggists and of the AMERICAN PHARMACEUTICAL ASSOCIATION.

Three children have graced the family circle, a daughter and two sons; the former is married and resides in Indianola. All are college graduates. The elder son, John W., Jr., is principal of Clarinda, Iowa, High School, and the other son, Glenn G., is a bacteriologist of the food, drug and insecticide division of the Department of Agriculture, Washington, D. C.

The subject of the brief sketch is a former Mayor of Indianola, having held the office for four terms.

---

**Have you made your arrangements for the Dallas Meeting—see July JOURNAL, pages 646 and 647?**

# EDITORIAL

E. G. EBERLE, EDITOR 2215 Constitution Ave., WASHINGTON, D. C.

## THE VALUE OF EXHIBITS.

THE value of scientific and professional exhibits is being impressed on the visitors at the Centennial Exposition in Texas. A striking example is that of cottonseed, which, within the knowledge of many, will be remembered as a nuisance or used, because these were considered waste, for purposes for which other material was better suited. Now the products of cottonseed are numerous, comprising many that are highly useful, and some of them have pharmaceutical value. The departments of agriculture, of nation and state, are educating the public at these expositions relative to the resources, and the money given to these promotions represents investments which will bring good returns.

Henry Ford said in substance at the meeting of the Chemurgic Council that industry and agriculture are natural partners, and the time will come when the farmer will stand on both feet—one foot on the soil for his livelihood; the other in industry for needed cash. A comparative statement may be made relative to scientific and professional values. Some of the former celebrations had interest for the visitors without the educational value, which is outstanding in the recent expositions.

Under the editorship of Eben J. Carey an illustrated post-exposition book, "A Century of Progress, Medical Science Exhibits," has been published. It is a pictorial history of what was one of the most popular group exhibits in the Chicago Exposition. Those who had the opportunity of seeing the latter will recall the displays of the medical sciences and professions, including that of pharmacy. There is a growing valuation by physicians, dentists and others of the medical groups of the local and state displays of preparations of the Pharmacopœia and National Formulary, and the recent expositions have developed a better understanding and greater appreciation by the public of medicine and pharmacy. The laity should be brought into more frequent contact with pharmaceutical service at state and national conventions and parts of the programs should be arranged, if possible, with that end in view.

## THE STORY OF LIFE.

THE Story of Life at the Texas Centennial Exposition was assembled under the supervision of the United States Public Health Service. The individual exhibits of Pharmacy, Medicine and Dentistry were sponsored by the AMERICAN PHARMACEUTICAL ASSOCIATION, the American Medical Association and the American Dental Association. Other units are sponsored by medical and dental institutions of Texas. The Smithsonian Institution has an exhibit, based on the knowledge gained from its geological studies. The U. S. Public Health Service has a display of dioramas, transparencies and charts.

The data for this comment are taken from a report by H. C. Christensen, who had charge of the pharmacy exhibit in Chicago and has supervision of the one in Texas. The Medical Science exhibits present in logical continuity a visualization of how the various divisions, including pharmacy, have made tremendous strides

during the past century relative to the causes, detection and prevention of human and animal diseases, and the relation of these professions to each other and to the laity.

The focal point of the Pharmacy Exhibit is a beautiful prescription case. The shelves are fitted with bottles containing an assortment of chemicals, appropriate decorations adorn the case and prescription utensils and apparatus form part of the instructive display. A collection of reference books, including the U. S. Pharmacopœia, National Formulary, A. PH. A. Recipe Book, A. M. A. "New and Non-official Remedies" are shown as essentials in professional pharmacy.

Official preparations are shown in a cabinet, properly labeled and the importance depicted in a way which acquaints the public with them, and with the development of materia medica. A background of the display shows progress and research. The history of Cinchona is illustrated in connection with early discoveries of its constituents, and represents part of the Chicago exhibit. The importance of education and its progress is stressed and the need for care in selection and preservation emphasized.

A number of items which formed part of the Chicago exhibit have been brought into this display and while the space allotted is not nearly as large, the fact has been taken into consideration by concentration of the material, with due consideration for the educational value and impressing the professional status and service of pharmacy.

Smaller displays feature the application and use of medicinals in the treatment of diseases, based largely on the research in laboratories and by the Public Health Service; these displays are changed and replaced from time to time.

The Chicago collection included in its scope the professional aspect of pharmacy and a century of progress in the history and educational phases of pharmacy; the Texas exhibit stresses the professional phase and forms part of the Story of Life and the pharmacist's service in the treatment and prevention of diseases, as a member of the public health groups.

---

## TEXAS PHARMACEUTICAL HISTORY.

Walter D. Adams rendered a valuable and distinct service to pharmacy at large and Texas pharmacy in particular by the collection of photographs and historical material. He secured pictures or photographs of every secretary and every president of Texas Pharmaceutical Association, and the proceedings of all sessions of the organization. Liberty is taken in reproducing the illustrations on page 667 from the 50th Anniversary numbers (1929) of the *Texas Druggist*.

The majority of those in the picture shown were Charter Members, those not identified but believed to be in the group are: Zac Wall, R. E. Luhn, J. L. Mills and R. F. Eisenlohr. Others in the group were not Charter Members; those identified, without classification, are: *Seated, left to right:* W. J. Betterton, Thomas Walker, J. G. Campbell, L. Meyers Connor, T. W. Powell. *Standing:* W. H. Murdock (?), L. C. Reviere (?), W. H. Patterson, Rudolph Voelcker (?), S. C. Weatherby, Zac Tolliver, E. M. Wells, J. L. Williams. A question mark has been placed after several names, indicating that there is uncertainty relative to the identification.

The lower group shows the members of the first Texas State Board of Pharmacy appointed by Governor T. M. Campbell, August 6, 1907. *Left to right, standing:* Bruce Vredenburg, Beaumont; Tom J. Snell, Cooper; John A. Weeks, Ballinger. *Seated:* W. F. Robertson, Gonzales; W. H. Roberts, Jr., Denison; R. H. Walker, Secretary, Gonzales.

Prior to this time Texas had District Boards of Pharmacy.

# SCIENTIFIC SECTION

BOARD OF REVIEW OF PAPERS.—*Chairman*, F. E. Bibbins; Glenn L. Jenkins, John C. Krantz, Jr., Heber W. Youngken, L. W. Rowe, L. W. Rising, C. O. Lee, E. V. Lynn, W. G. Crockett, Frederick V. Lofgren.

## STUDIES ON POPLAR BUD.*

BY GERSTON BRUCH AND ELMER H. WIRTH.[1]

While the first American monograph of Poplar Bud appeared as recently as 1916, (1) the use of Poplar Bud in medicine dates into antiquity. It is probable that Dioscorides (2) refers to the bud when he says of *Populus nigra*, "Aigerios.. the seed (?) thereof being dranck with vinegar is good for the epilepticall." Dalecampi (3) mentions *Populus nigra* as being used by both Dioscorides and Theophrastus. John Gerarde (4) states in his Herbal that "the buds of the black poplar which show themselves before the leaves spring out, are of a reasonable good favor, of which is made that profitable ointment called Unguentum Populeon." Joannis de Renou in his "Three Books of Medicinal Materials," published some twenty-five years after the Herbal says, "the first buds this tree emits, which are the rudiments of future leaves, are long and acute, full of some fat, oleous and resinous matter, which is subsalve and adheres to the fingers of the Tangents. Apothecaries call them *oculus populi*, which excerpe in the beginning of the spring, bruise, and recond in a figuline with swines grease till June for the confecture of the popular Unguent." A century after this they appear in the Unguentum Populeum of the Wirtenberg Pharmacopœia (5).

The virtues of the poplar buds, says the United States Dispensatory of 1834, are similar to those of the turpentines and balsams being used in tinctures, liniments and ointments for nephritic and rheumatic complaints. Ointments made with poplar bud occur frequently in the 19th century, examples of which are the Pomatum Populeum of the Paris Codex of 1837, the Unguentum Populi of the German Pharmacopœia of 1872 and the Unguentum Populeum of the Russian Pharmacopœia of 1880.

Balm of Gilead Buds appear as an ingredient of compound syrup of white pine in the National Formulary of 1896 but not until the 1916 edition do they appear as a crude drug. In connection with the sixth revision of the National Formulary, Chairman Gathercoal requested that the authors make a study of Poplar Bud, particularly as to the establishment of standards. A search of the literature revealed that very little in the way of investigation of poplar bud had been published. It was therefore decided to make an anatomical study as well.

Eleven commercial samples of Poplar Bud were obtained from various sources. Certain of the samples were sent to Dr. H. W. Youngken who identified them by means of authentic specimens collected at the Arnold Arboretum. Through his courtesy we were able to establish the identity of the buds for histological study. This study, in turn, enabled us to check the identity of the eleven commercial sam-

* Scientific Section, A. PH. A., Portland meeting (Ore.), 1935.

[1] Pharmacognosy Laboratory of The University of Illinois, College of Pharmacy, Chicago.

ples. It is interesting to note that eight of the samples were *Populus candicans*, Ait., two *Populus balsamifera* L. and one *Populus nigra* L., which would seem to indicate that the most prevalent species appearing on the American market was *candicans*.

MACROSCOPIC STUDIES.

Several representative buds (Fig. 1.) from each sample were selected, measured, dissected and studied. The results of these studies have been condensed into the following macroscopical descriptions.

*Leaf Buds.*—The leaf buds are conical or pyramidal, pointed, up to 25 mm. in length (in all varieties) and up to 15 mm. in thickness in *Populus candicans*, and up to 5 mm. in thickness in *Populus balsamifera* and *Populus nigra*. Externally they are reddish brown to dark reddish brown and when fresh glossy and glutinous and often covered with a resinous exudation. This resinous exudation is usually very prominent on *P. candicans* and less prominent or absent on *P.*

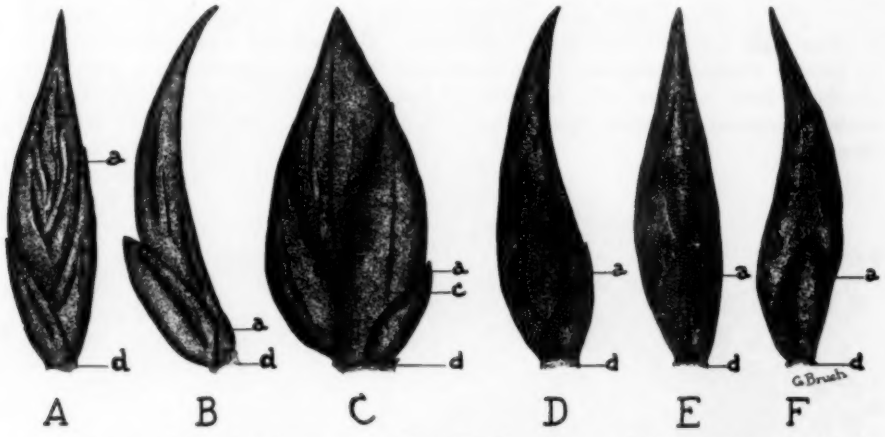



Fig. 1.—Entire Poplar Buds (× 2). *Populus nigra:* *A*, leaf bud, *a*, outer scale, *d*, stem scar. *B*, flower bud, *a*, outer scale, *d*, stem scar. *Populus candicans:* *C*, leaf bud, *a*, outer scale, *c*, second scale, *d*, stem scar. *D*, flower bud, *a*, outer scale, *d*, stem scar. *Populus balsamifera:* *E*, leaf bud, *a*, outer scale, *d*, stem scar. *F*, flower bud, *a*, outer scale, *d*, stem scar.

*balsamifera* and *P. nigra*. The buds of *candicans* are therefore usually darker after aging than those of the other species. The bud (Fig. 2) consists of one to three small immature leaves located centrally and toward the base of the bud. These are enclosed by about 15 oblong, pointed, concave, closely imbricated scales in *P. candicans* and about 10 scales in *P. balsamifera* and *P. nigra*. The buds of *P. candicans* exhibit up to 5 shorter, outer imbricated scales; those of *P. balsamifera* up to 4 shorter outer scales and those of *P. nigra* up to 3. The scales are agglutinated with a sticky resinous substance containing numerous microscopic prisms of salicin which display colors in polarized light. When viewed with a lens the scales of *P. candicans* exhibit hairs along the margin, those of *P. balsamifera* exhibit hairs on the dorsal surface and those of *P. nigra* exhibit no hairs.

*Flower Buds.*—The flower buds (Fig. 1) are thin, conical, up to 25 mm. in length and up to 15 mm. in thickness in *P. candicans*, and up to 5 mm. in the other species. They are more or less curved and consist of one very short, small outer scale (occasionally a second outer scale) and three to four large inner scales enclosing a catkin of immature flowers (Fig. 2.). Externally the buds are reddish brown to dark reddish brown and less glossy and glutinous than the leaf buds. Both leaf and flower buds have a peculiar, agreeable and somewhat balsamic odor and an aromatic bitter taste.

Fig. 2.—Poplar Buds in longitudinal section (× 2). *Populus nigra: A*, leaf bud, *a*, outer scale, *b*, resinous exudation, *d*, stem scar. *B*, flower bud, *a*, outer scale, $b_1$, catkin of flower. *Populus candicans: C*, *a*, outer scale, *b*, resinous exudation, *d*, stem scar. *D*, flower bud, *a*, outer scale, $b_1$, catkin of flower. *Populus balsamifera: E*, *a*, outer scale, *b*, resinous exudation, *d*, stem scar. *F*, flower bud, *a*, outer scale, $b_1$, catkin of flower.

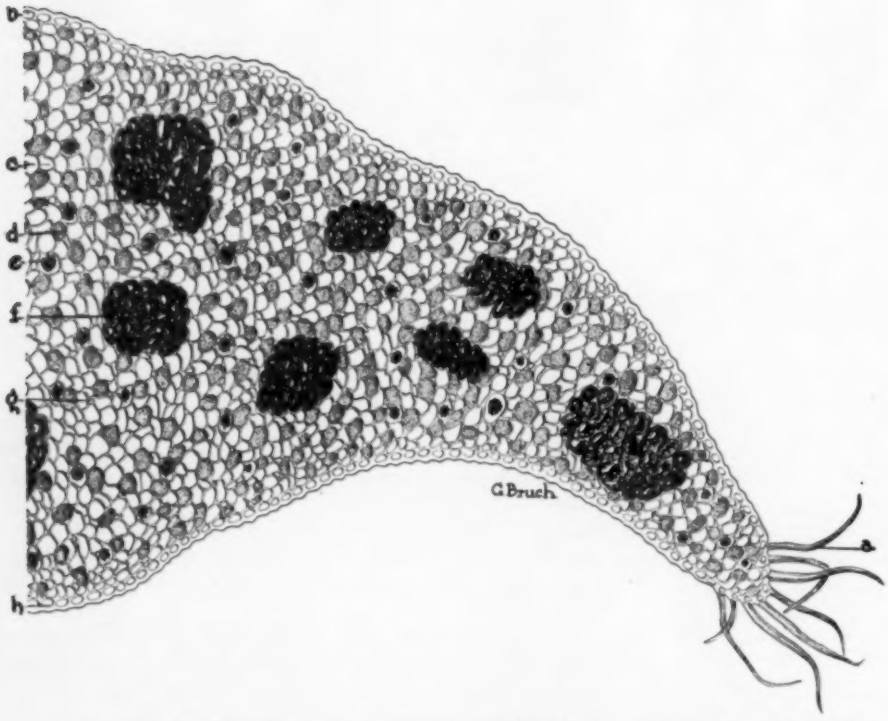



Fig. 3.—*Populus candicans*, transverse section of the outer bud scale (× 100). *a*, hair; *b*, outer epidermis; *c*, mesophyll parenchyma; *d*, yellowish brown cell content; *e*, rosettes of calcium oxalate; *f*, stone cells; *g*, intercellular space; *h*, inner epidermis.

MICROSCOPIC STUDIES.

Several representative buds were selected from each sample. These were dissected and sections were cut from the various scales comprising each bud. Studies from these sections have been condensed into the following histological descriptions.

POPULUS CANDICANS. OUTER BUD SCALE. (FIG. 3.)

*Outer Epidermis.*—A single row of nearly isodiametric cells with comparatively thin inner and lateral walls and a heavily cutinized outer wall; up to 0.015 mm. in diameter. The epidermal cells are occasionally modified into narrow conical unicellular hairs with thick lignified walls, up to 0.230 mm. in length and up to 0.015 mm. in diameter at the base. These hairs usually occur only at the margin but in rare instances have been found to occur on the dorsal surface.

*Mesophyll.*—The mesophyll consists of from 30 to 40 rows of isodiametric parenchyma cells with more or less thickened walls; up to 0.025 mm. in size and occasionally separated by intercellular spaces. Many of the cells exhibit a yellowish brown content.

Numerous rosettes of calcium oxalate up to 0.020 mm. are scattered throughout the mesophyll. Stone cells up to 0.025 mm. in size and occurring singly or in groups are scattered throughout the mesophyll. (The groups of stone cells do not occur in a horizontal row as in *P. balsamifera*.) Starch is absent.

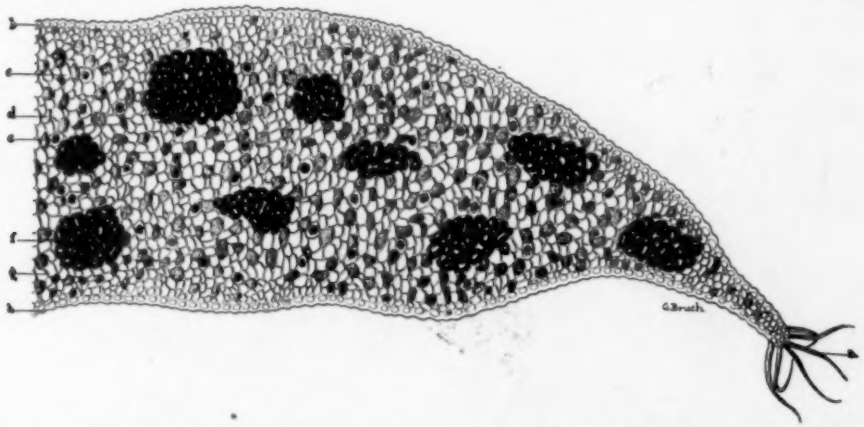


Fig. 4.—*Populus candicans.* Transverse section of inner bud scale (× 75). *a*, hairs; *b*, outer epidermis; *c*, mesophyll parenchyma; *d*, yellowish brown cell content; *e*, calcium oxalate rosette; *f*, stone cells; *g*, intercellular space; *h*, inner epidermis.

*Inner Epidermis.*—A single row of slightly elongated cells up to 0.020 mm. in size, having cutinized outer walls.

INNER BUD SCALES. (FIG. 4.)

The inner bud scales are similar in structure to the outer bud scale except for the following differences: The mesophyll is somewhat narrower varying between 15 and 30 cells in thickness and the cells of the inner epidermis are usually isodiametric (instead of slightly elongated) and up to 0.015 mm. in size. No appreciable histological difference is apparent between the scales of leaf and flower bud.

POPULUS BALSAMIFERA. OUTER BUD SCALE. (FIG. 5.)

*Outer Epidermis.*—A single row of isodiametric cells up to 0.015 mm. in size. The inner and lateral walls of the cells are comparatively thin but the outer wall is heavily cutinized. Many of the cells of the dorsal epidermis are modified into long, narrow, conical, unicellular, non-glandular hairs with thick lignified walls. These hairs range up to 0.260 mm. long and up to 0.020 mm. wide at the base.

*Mesophyll.*—The mesophyll consists of from 15 to 20 rows of more or less polygonal and approximately isodiametric parenchyma cells with rather thickened walls. The cells are up to 0.020 mm. in diameter and are occasionally separated by intercellular spaces. Many of the cells contain a yellowish brown content. Rosettes of calcium oxalate up to 0.020 mm. in size are scattered throughout the mesophyll. Groups of isodiametric stone cells are interspersed throughout the mesophyll, each group consisting of from a few to about 80 stone cells, with porous lignified walls, the individual cells varying up to 0.025 mm. in diameter. These groups of stone cells are usually located in a horizontal row nearer to the inner epidermis. Starch is absent.

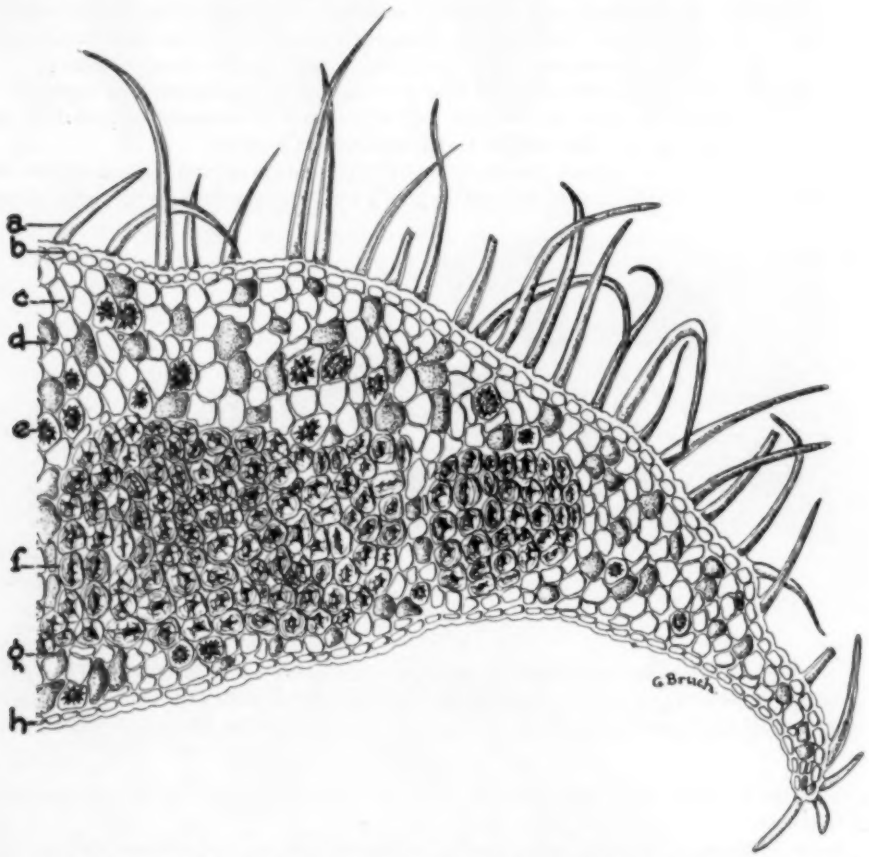



Fig. 5.—*Populus balsamifera.* Transverse section of the bud scale (× 100). *a*, hairs; *b*, outer epidermis; *c*, mesophyll parenchyma; *d*, yellowish brown cell content; *e*, calcium oxalate rosettes; *f*, stone cells; *g*, intercellular space; *h*, inner epidermis.

*Inner Epidermis.*—A single row of somewhat laterally elongated cells with cutinized outer walls. The cells vary in length up to 0.025 mm.

*Inner Bud Scales.*—The inner bud scales exhibit a structure similar to that of the outer bud scales except that they show a less complete development, are thinner (up to 15 rows of mesophyll cells), exhibit fewer stone cells and show less pubescence. No appreciable histological difference is apparent between the flower and leaf bud.

### POPULUS NIGRA. OUTER BUD SCALE. (FIG. 6.)

*Outer Epidermis.*—A single row of isodiametric cells with comparatively thin inner and lateral walls and heavily cutinized outer walls, up to 0.015 mm. in size.

*Mesophyll.*—The mesophyll varies in thickness from 15 to 25 rows of cells. The parenchyma cells are approximately isodiametric, up to 0.025 mm. in diameter and are occasionally separated by intercellular spaces. The cell walls are more or less thickened, those cells nearer the outer epidermis usually exhibiting the greater thickening. Many of the cells exhibit a yellowish brown content. Rosettes of calcium oxalate up to 0.020 mm. in diameter are scattered throughout the mesophyll parenchyma. Groups of stone cells, usually located in a horizontal row nearer the inner epidermis consist of, from a few to 75 individual cells. The individual stone cells show thick, porous, strongly lignified walls and vary in size up to 0.040 mm. Starch is absent.

*Inner Epidermis.*—One row of isodiametric cells with relatively thin inner and lateral walls and a more or less heavily cutinized outer wall.

The inner bud scales exhibit a similar structure to the outer scales. There is no appreciable difference in structure between the scales of leaf and flower buds.

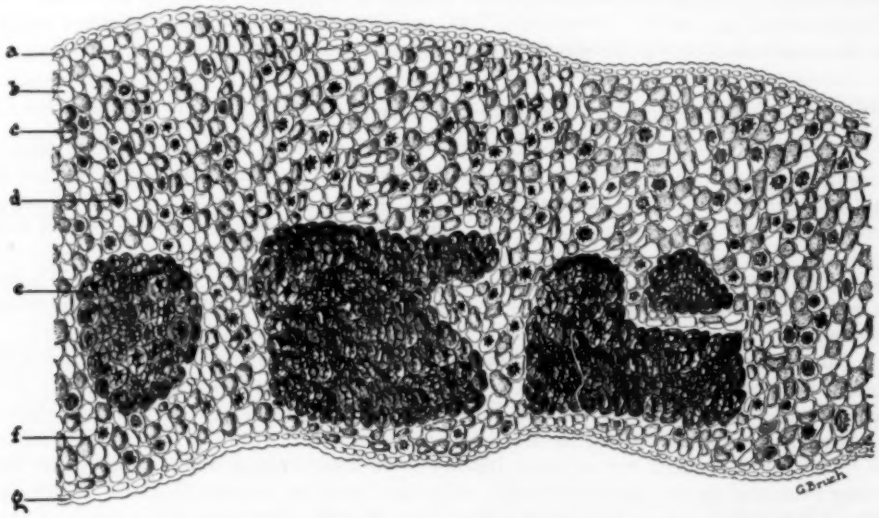



Fig. 6.—*Populus nigra.* Transverse section of the bud scale (× 100). *a*, upper epidermis; *b*, mesophyll parenchyma; *c*, yellowish brown cell content; *d*, calcium oxalate rosettes; *e*, stone cells; *f*, intercellular spaces; *g*, inner epidermis.

The difference between the three poplar buds official in the N. F. V may be tabulated as follows:

| | *P. candicans.* | *P. balsamifera.* | *P. nigra.* |
|---|---|---|---|
| Size | | | |
| Length | Up to 25 mm. | Up to 25 mm. | Up to 25 mm. |
| Breadth | Up to 15 mm. | Up to 5 mm. | Up to 5 mm. |
| Resinous exudation | Prominent | Less prominent or absent | Less prominent or absent |
| Number of scales | Up to 15 | Up to 10 | Up to 10 |
| Shorter outer scales | Up to 5 | Up to 4 | Up to 3 |
| Hairs | At the margin of scale only | Interspersed over outer surface of scale | Absent |
| Hairs | | | |
| Size | | | |
| Length | Up to 0.230 mm. | Up to 0.260 mm. | |
| Breadth | Up to 0.015 mm. at base of hair | Up to 0.020 mm. at base of hair | |

| | | | |
|---|---|---|---|
| Mesophyll, | | | |
| Outer scale | 30–40 cells wide | 15–20 cells wide | 15–25 cells wide |
| Inner scale | 15–30 cells wide | 15–20 cells wide | 13–25 cells wide |
| Stone cells | Single or in groups | Single or in groups | Single or in groups |
| Number in a group | Up to 25 cells | Up to 80 cells | Up to 75 cells |
| Occurrence | Scattered thruout mesophyll | Horizontal row closer to inner epidermis | Horizontal row closer to inner epidermis |
| Size | Up to 0.025 mm. | Up to 0.025 mm. | Up to 0.040 mm. |

### OTHER POPLAR BUDS.

Farwell (6) has called attention to the appearance on the market of buds whose source was *P. Tacamahacca*. Through the courtesy of Dr. Youngken we were able to obtain authentic buds of *P. Tacamahacca*, Mill. and *P. Trichocarpa*, Torr. and Gray (8). These were examined histologically, the observations being condensed into the following descriptions.

### POPULUS TACAMAHACCA.

The leaf buds are pyramidal, pointed, up to 20 mm. in length and up to 6 mm. in diameter. Externally they are reddish brown to dark reddish brown, glossy and glutinous. The bud consists of from one to three small immature leaves located centrally at the base of the bud and surrounded by about 7 oblong, pointed, concave, closely imbricated bud scales agglutinated with a resinous substance. These are surrounded at the base by from 2 to 3 shorter outer scales. The flower buds are up to 20 mm. in length and up to 5 mm. in thickness. They consist of a single short outer scale and up to 3 larger inner scales enclosing the catkin. Microscopically they show the following characteristics:

*Outer Epidermis.*—A single row of isodiametric cells, the outer walls of which are heavily cutinized. The inner wall is thin but the lateral walls show considerable thickening. A few unicellular non-glandular hairs are found at the margin of the scale only. These vary up to 0.125 mm. in length and up to 0.015 mm. in breadth at the base.

*Mesophyll.*—A single row of what appears to be water-storage cells is found just below the outer epidermis in the outer scale only. The cells occur in palisade form and are devoid of contents. The balance of the mesophyll is from 15 to 25 cells in breadth being composed largely of isodiametric parenchyma cells up to 0.020 mm. in diameter. Calcium oxalate rosettes up to 0.020 mm. in diameter occur frequently. The stone cells occur singly or in small groups (up to 10 in a group) usually situated nearer to the inner epidermis, the individual cells being up to 0.075 mm. in diameter. The occurrence of stone cells is considerably less frequent than in the officially recognized varieties. Starch is absent.

*Inner Epidermis.*—A single row of isodiametric cells with cutinized outer walls.

### POPULUS TRICHOCARPA.

The leaf buds are conical, pointed, up to 23 mm. in length and up to 8 mm. in thickness. Externally they are reddish brown to dark reddish brown. The bud consists of from one to three small immature leaves located centrally at the base and surrounded by about 8 oblong, pointed, concave, closely imbricated and agglutinated scales. These are surrounded at the base by 3 to 4 shorter outer scales. The flower buds are conical, up to 30 mm. long and up to 5 mm. thick. They are slightly curved and consist of a very short, small outer scale and about 3 larger inner scales enclosing the catkin. Cross sections show the following characteristics:

*Outer Epidermis.*—A single row of cells which are considerably laterally elongated. The cells are about 0.020 mm. long and have cutinized outer walls. Hairs practically absent.

*Epidermis.*—The mesophyll is up to 55 cells in breadth, the parenchyma cells being isodiametric and up to 0.025 mm. in diameter. Rosettes of calcium oxalate up to 0.020 mm. occur frequently. Stone cells up to 0.075 mm. in size are of frequent occurrence, usually being found in greater number nearer the inner epidermis. The stone cells occur singly or in groups up to 50. Starch is absent.

*Inner Epidermis.*—A single row of isodiametric cells with cutinized outer walls.

Buds from *P. deltoides*, Marsh, a frequently cultivated shade tree in northern Illinois were gathered by the authors. These buds exhibited the following characteristics.

### POPULUS DELTOIDES.

The leaf buds are pyramidal, pointed, up to 23 mm. in length and up to 6 mm. in thickness at the base. Externally they are reddish brown and less glutinous than the official buds. The bud consists of an immature leaf located centrally near the base surrounded by about 8 oblong, pointed scales, the whole being surrounded at the base by up to four shorter outer scales. The flower buds are conical, up to 25 mm. in length and up to 7 mm. in thickness. They consist of a short outer scale and three inner scales surrounding the catkin. The bud scales show the following microscopical characteristics:

*Outer Epidermis.*—A single row of cells more or less radially elongated and up to 0.020 mm. in size. Hairs are absent.

*Mesophyll.*—The mesophyll is up to 20 cells in breadth, being composed largely of isodiametric parenchyma cells up to 0.020 mm. in diameter and containing calcium oxalate rosettes up to about 0.020 mm. in size. The stone cells occur singly or in small groups (up to 25), the individual cells being up to 0.025 mm. in size. The occurrence of stone cells is very frequent. Starch is absent.

*Inner Epidermis.*—A single row of cells with cutinized outer walls. The histological characteristics of *P. Tacamahacca*, *P. Trichocarpa* and *P. deltoides* buds may be summarized as follows:

| | *P. Tacamahacca.* | *P. Trichocarpa.* | *P. Deltoides.* |
|---|---|---|---|
| Epidermis | Cells isodiametric thick lateral and outer walls | Cells considerably elongated laterally | Cells elongated radially |
| Hairs | Present (at margin only) up to 0.125 mm. long up to 0.015 mm. broad at base | Absent | Absent |
| Water-storage palisade | Present (in outer scale only) | Absent | Absent |
| Mesophyll | Up to 25 cells broad | Up to 55 cells broad | Up to 20 cells broad |
| Stone cells | Few, up to 10 in a group | Frequent, up to 50 in a group | Frequent, up to 25 in a group |
| Stone cells | Up to 0.075 mm. | Up to 0.075 mm. | Up to 0.025 mm. |

The authors were unable to find buds agreeing with the characteristics of *P. Tacamahacca*, *P. Trichocarpa* or *P. deltoides* in the eleven commercial samples of Poplar Bud examined by them.

### QUALITY STANDARDS.

Since the principal constituents of poplar bud are more or less resinous in nature it was decided that a quantitative solvent extraction might best serve as an indication of quality. About 300 Gm. of Poplar Bud were reduced to a course powder by chopping. After thoroughly mixing, approximately 12-Gm. samples of this coarse powder were completely extracted in a Soxhlet extractor (48 hours) using a variety of solvents. After removing the solvent, the extractive was dried to constant weight, the percentage being calculated on the weight of the original sample. Averages for these extractive experiments are as follows:

| | |
|---|---|
| Ether | 45.0% |
| Chloroform | 49.1% |
| Alcohol | 62.3% |
| Benzol | 47.8% |
| Petroleum benzin | 4.3% |
| Carbon tetrachloride | 20.5% |

These results show alcohol to be the best solvent and with this fact established it was decided to endeavor to adapt an alcoholic extractive method. The alcohol-soluble extractive method of the United States Pharmacopœia (7) being an established method was selected as probably being suitable for adaption to Poplar Bud. Approximately 2-Gm. samples of the prepared drug, accurately weighed are macerated in about 70 cc. of alcohol in a suitable flask. The flask is shaken at 30-minute intervals during eight hours, and then allowed to stand for sixteen hours without shaking. The contents of the flask are then filtered into a 100-cc. volumetric flask, the flask and residue being washed with small quantities of alcohol until the filtrate measures 100 cc. A 50-cc. aliquot portion of the filtrate is evaporated to dryness on a water-bath and dried to constant weight at 110°, the percentage of anhydrous extractive being calculated from the weight of the drug taken.

Eight samples were selected from the various lots of commercial Poplar Bud at hand. Since Poplar Bud cannot be ground in a mill the samples were prepared by chopping as finely as possible in a chopping bowl and then mixing the chopped material on paper.

Results obtained by submitting the eight selected samples to the alcohol-soluble extractive method were as follows: 23.0%; 43.0%; 41.1%; 48.9%; 20.1%; 37.6%; 44.1% and 44.2%.

While the above results show considerable variation (20.1% minimum to 48.9% maximum) it will be observed that five of the eight samples run well over 40% and one sample approaches that figure. It therefore seemed that 40% might be tentatively selected as a suitable minimum standard. In order to establish the feasibility of selecting this standard a careful analytical study of the samples at our command was carried out. The questions arising were: Why do some samples run high and some low? Is there any relation between botanical source and the quantity of alcohol-soluble extractive? Is there any relation between appearance and alcohol-soluble extractive? Does a high content of flower buds affect the alcohol-soluble extractive?

A. A portion of each original sample was reduced to a coarse powder and submitted to the alcohol-soluble extractive method.

B. A second portion of each original sample was separated into leaf and flower buds, the percentage of flower buds (by weight) being determined.

C. The flower and leaf buds from each original sample were reduced to a coarse powder separately and each portion submitted to the alcohol-soluble extractive method.

This gave four results for each sample, *i. e.*, (1) The percentage of flower buds. (2) The average alcohol-soluble extractive of the sample as such. (3) The average alcohol-soluble extractive of the leaf bud portion of the sample. (4) The average alcohol-soluble extractive of the flower-bud portion of the sample. The results are tabulated in Table I.

TABLE I.*

| Sample Number. | Botanical Source. | % Flower Bud (by Weight). | % Alc.-Ext. of Sample. | % Alc.-Ext. Leaf Bud. | % Alc.-Ext. Flower Bud. |
|---|---|---|---|---|---|
| I | *P. balsamifera* | 97.0 | 17.1 | 45.8 | 15.8 |
| II | *P. candicans* | 16.1 | 43.1 | 43.8 | 16.8 |
| III | *P. candicans* | 4.0 | 49.4 | 48.7 | 15.4 |
| IV | *P. candicans* | 9.2 | 46.5 | 47.4 | 18.0 |
| V | *P. nigra* | 76.6 | 20.7 | 44.6 | 14.6 |
| VI | *P. candicans* | 11.1 | 44.3 | 48.3 | 18.3 |
| VII | *P. candicans* | 1.5 | 49.0 | 51.5 | 13.6 |
| VIII | *P. candicans* | 2.6 | 50.1 | 51.3 | 28.4 |
| IX | *P. candicans* | 20.2 | 48.9 | 51.0 | 23.4 |
| X | *P. balsamifera* | 74.7 | 20.8 | 45.8 | 16.1 |
| XI | *P. candicans* | 15.4 | 57.9 | 58.8 | 22.8 |

* Samples I and II are museum samples of considerable age; Sample III was purchased about ten years ago and Samples IV to XI (incl.) were purchased from wholesale houses within the past two years.

## COMMENTS.

The results exhibited in Table I seem to show:

(1) That the alcohol-soluble extractive of the flower buds, averages considerably lower than that of the leaf buds.

(2) Where the flower-bud content of a sample is high the alcohol-soluble extractive is usually proportionately low.

(3) That it is not uncommon to find a flower-bud content higher than 10%. (The N. F. V limit.)

(4) That while a high flower bud content usually indicates an inferior sample as to alcohol-soluble extractive (I, II, V and X) it does not always follow that a flower bud content of over 10% indicates a poor sample (Sample IX, for example, with a 20.2 flower bud content runs 48.9% alcohol-soluble extractive and Sample XI with a flower-bud content of 15.4% runs 57.9% alcohol-soluble extractive).

(5) No definite conclusion as to the relation between botanical source and alcohol-soluble extractive can be drawn from the samples examined. The two samples of *P. balsamifera* and the sample of *P. nigra*, the only samples of these varieties obtainable, all ran excessively high in flower buds and consequently low in alcohol-soluble extractive. If, on the other hand, we examine the alcohol-soluble extractive of the leaf buds only, in these samples we find them to run among the average. It therefore might not be amiss to conclude that a sample of either species, low in flower bud content would be acceptable as far as alcohol-soluble extractive is concerned. *P. candicans*, however, seems to run very acceptable both as to flower bud content and alcohol-soluble extractive.

(6) General appearance might be in a sense considered indicative of quality. Buds covered with an abundance of resinous exudation usually run high in alcohol-soluble extractive and those which are dry and brittle usually run low. In *P. candicans* the flower buds may easily be distinguished from the leaf buds by their shape. This is considerably more difficult in the other species, which fact may account for the higher flower bud content in the other species. In this connection Farwell (6) states that the proper time to collect the buds is in the spring when the trees are in full bloom and before the leaf buds have broken, so as to avoid gathering flower buds. It is doubtful whether this is ever carried out in practice as the interval between flowering and breaking into leaf is a relatively short one. It is also questionable whether leaf buds gathered just before breaking are as high in alcohol-soluble extractive as those gathered earlier in the season.

## SUMMARY.

(1) Morphological studies of the three Poplar Buds official in the N. F. V have been made and histological means for their differentiation enumerated.

(2) Morphological and histological characters of some unofficial poplar buds are also described.

(3) A method for the determination of the quality of Poplar Bud based upon alcohol-soluble extractive is suggested.

(4) Forty per cent is tentatively advised as a suitable minimum standard for alcohol-soluble extractive.

(5) A comparative study of the alcohol-soluble extractive of leaf and flower buds shows the flower buds to be considerably inferior. It appears that the present (N. F. V) limit of not more than 10% is probably too restrictive.

BIBLIOGRAPHY.

(1) National Formulary IV (1916).

(2) The Greek Herbal of Dioscorides. Book I, No. 113 Goodyer-Gunther Translation, Oxford (1934).

(3) Dalecampi, "Historia Beneralis Plantarum," Lond., 1587.

(4) Gerarde, John, "The Herbal or General Historie of Plants," London, 1633 (Book III, page 1486.)

(5) Pharmacopœia Wirtenbergica, Stutgart, 1754.

(6) Farwell, O. A., "Source of Balsam Poplar Buds," Jour. A. Ph. A., 11, (1922), 184.

(7) United States Pharmacopœia X, page 466.

(8) *P. Tacamahacca*, Mill. (Gard. Dict. et. viii) is the northern Balsam Poplar. This plant was described under the name of *Populus balsamifera* by Duroi, which has probably given rise to confusion with *P. balsamifera*, Linné. In connection with this it should also be pointed out that *P. balsamifera* Linné, the true balsam poplar has been referred to by the synonyms "Cottonwood" and "Tacamahac."

(9) *P. trichocarpa*, Miller (Torrey and Gray ex Hook. Ic. Pl. t 878) is the Black Cottonwood ranging from California to Oregon, British Columbia and Alaska. It is sometimes known as the "Western Balsam Poplar."

---

# MONARDA PECTINATA, NUTT., A PHYTOCHEMICAL STUDY.*[1]

BY JOSEPH B. BURT.

## II. The Volatile Oil.

### A. DISTILLATION OF THE VOLATILE OIL.

1152½ lbs. of the fresh flowering herb of *Monarda pectinata*, Nutt., collected near Signal Hill, Scottsbluff County, Nebraska, and distilled, in July 1932, in the field while fresh, yielded 2688 cc. (2552.65 Gm.) of oil, corresponding to 0.486 per cent. Cohobation being impractical in the field, all water-soluble oil was discarded.

The oil was dark reddish brown in color. $d_{25°} = 0.9496$, $n_{D25°} = 1.5070$. The optical rotation could not be ascertained because of the dark color. When the total phenols were determined in accordance with the assay process for Oil of Thyme (1), two samples showed 77 per cent by volume.

### B. SEPARATION OF PHENOLS.

In order to avoid an excess of alkali, about one-half of the theoretical amount of sodium hydroxide, in 5 per cent solution, was used, and the process repeated, each succeeding portion being reduced progressively by one-half, until there was no further reduction in volume of the oil shaken with the aqueous solution of the alkali.

In the first experiment 224 cc. of the oil were treated in this manner with the following results:

---

* Scientific Section, A. Ph. A., Portland meeting, 1935.

[1] A portion of a thesis submitted to the Graduate School of the University of Wisconsin in partial fulfillment of the requirements for the degree of Doctor of Philosophy. (Pharmacy as major.)

| Extraction. | Vol. of Residual Oil. | Vol. of Phenols Removed. |
|---|---|---|
| 1st | 115 cc. | 109 cc. |
| 2nd | 80 cc. | 35 cc. |
| 3rd | 60 cc. | 20 cc. |
| 4th | 50 cc. | 10 cc. |
| 5th | 50 cc. | 00 cc. |

Hence, a total of 174 cc. were removed, corresponding to 77.68 per cent by volume.

### C. PHENOL PORTION OF THE OIL.

(1) Before separating the phenols from the combined aqueous solutions of the sodium phenates, 100-cc. portions were shaken with 10-cc. portions of petroleum ether in one instance and with ether in another. Both determinations were carried out in duplicate, following the directions for shaking, etc., of Sherk (2). The immiscible solvent solutions of the duplicate determinations were mixed, the solvent allowed to evaporate spontaneously, and the residues weighed. The results are recorded in the accompanying table.

| | Reduction in Volume (Cc.) Obtained by Shaking with: | | | | Weight of Residues. | |
|---|---|---|---|---|---|---|
| | Pet. Eth. I. | Pet. Eth. II. | Ether. I. | Ether. II. | Pet. Eth. | Ether. |
| Original solution | 100 | 100 | 100.0 | 100.0 | .... | .... |
| After 1st extr. | 99 | 99 | 102.4 | 102.8 | 2.1374 Gm. | 3.3732 Gm. |
| After 2nd extr. | 98 | 98 | 100.0 | 101.0 | 1.2229 Gm. | 4.7558 Gm. |
| After 3rd extr. | 97 | 97 | 95.5 | 95.5 | 0.7826 Gm. | 2.8851 Gm. |
| | | | | | 4.1429 Gm. | 11.0341 Gm. |

It should be noted that the ether extractions I and II were not made on the same day, the temperature being 30° for I and 27° for II. It becomes apparent that an appreciable amount of ether is dissolved in the aqueous solution of the phenates, also that the amount of oily substance (including phenols?) shaken out by ether is much greater than in the case of petroleum ether. The residues from the immiscible solvent solutions did not crystallize upon standing at room temperature, nor when exposed to the temperature of the refrigerator. All residues gave a positive reaction when subjected to the Flueckiger test for thymol and carvacrol.

When the extracts were chilled by the use of an ice and salt bath, there was no evidence of freezing or crystallization. Accordingly, solid carbon dioxide was used in an attempt to determine the freezing points. In no case did the extracts become perfectly solid, but they all became extremely viscid or semisolid.

Petroleum-Ether Extracts.

| Extraction. | Became Viscid at: | Began to Liquefy at: |
|---|---|---|
| 1st | −12° | −10° |
| 2nd | −12° | −10° |
| 3rd | −20° | −14° |

Ether Extracts.

| Extraction. | Became Viscid at: | Began to Liquefy at: |
|---|---|---|
| 1st | −24° | −20° |
| 2nd | Below −28° (Limit of thermometer) | −24° |
| 3rd | Below −28° (Limit of thermometer) | −24° |

It becomes apparent that petroleum ether is better adapted to remove non-phenols from the aqueous sodium phenate solution, should this be thought desirable. Neither petroleum ether nor ether removed appreciable amounts of the dark coloring substance from the aqueous solution.

The remaining 840 cc. of the alkaline solution of phenols were acidified with sulphuric acid without previous treatment with an immiscible solvent; 113 cc. (110.2 Gm.) of dark colored oil were thus obtained, $d_{24°}$ 0.97521. In order to ascertain, if possible, whether both thymol and carvacrol were present, the phenol was fractionated under diminished pressure (15 mm.) into four roughly equal fractions.

| | Temperature. | Volume. | Sp. Gr. at 27°. |
|---|---|---|---|
| 1st fraction | 112–120° | 23 cc. | 0.96968 |
| 2nd fraction | 120–125° | 42 cc. | 0.97306 |
| 3rd fraction | 125–130° | 19 cc. | 0.97362 |
| 4th fraction | 130°–decomp. | 11 cc. | 0.97492 |
| | | 95 cc. | |

A decided overlapping in the boiling point ranges was observed in all four fractions. After separating each fraction, distillation was resumed at temperatures considerably below the point indicated as the lower limit of the succeeding fraction.

Freezing points for the four fractions were determined by the use of solid carbon dioxide, after failure to obtain freezing by the use of an ice and salt freezing mixture, with the following results:

| Fraction. | Temperature Range. | Solidified at: | Began to Liquefy at: |
|---|---|---|---|
| 1st | 112–120° | −12° | − 9° |
| 2nd | 120–125° | − 8° | − 5° |
| 3rd | 125–130° | − 9° | − 4° |
| 4th | 130°–decomp. | −22° | −12° |

(2) The remainder of the oil, 2000 cc., was treated in four portions of 500 cc. each in like manner, yielding the following results:

| | Extraction. | Vol. of Residual Oil (Cc.). | Vol. of Phenols Removed (Cc.). |
|---|---|---|---|
| (1) | 1st | 318 | 182 |
| | 2nd | 192 | 126 |
| | 3rd | 138 | 54 |
| | 4th | 118 | 20 |
| | 5th | 112 | 6 |
| | 6th | 112 | 0 |
| | | | Total 388 |
| | Eq. to 77.60 per cent by volume. | | |
| (2) | 1st | 295 | 205 |
| | 2nd | 162 | 133 |
| | 3rd | 124 | 38 |
| | 4th | 112 | 12 |
| | 5th | 112 | 0 |
| | | | Total 388 |
| | Eq. to 77.60 per cent by volume. | | |
| (3) | 1st | 320 | 180 |
| | 2nd | 190 | 130 |
| | 3rd | 142 | 48 |

| | | | |
|---|---|---|---|
| | 4th | 124 | 18 |
| | 5th | 112 | 12 |
| | 6th | 112 | 0 |
| | | | Total 388 |

Eq. to 77.60 per cent by volume.

| | | | |
|---|---|---|---|
| (4) | 1st | 320 | 180 |
| | 2nd | 190 | 130 |
| | 3rd | 132 | 58 |
| | 4th | 126 | 6 |
| | 5th | 113 | 13 |
| | 6th | 113 | 0 |
| | | | Total 387 |

Eq. to 77.40 per cent by volume.

The four portions were mixed and the specific gravity was determined at 27° as 0.97347. The total volume obtained, 1551 cc., is equivalent to 1509.85 Gm. As a matter of convenience in handling, the entire quantity was divided into three approximately equal portions and each portion was subjected to distillation under diminished pressure, the distillate from each portion being collected in four fractions. There resulted thereby twelve fractions in all, as follows: Three first fractions, three second fractions, three third fractions and three fourth fractions. Each group of the three fractions of like number were combined, giving rise to combined first, second, third and fourth fractions, and the volumes were measured.

| | 1st Fraction. | 2nd Fraction. | 3rd Fraction. | 4th Fraction. | Pressure. |
|---|---|---|---|---|---|
| 1 | 106–113° | 113–118° | 110–122° | 111–125° | 8–16 mm. |
| 2 | 106–114° | 109–118° | 111–120° | 111–125° | 5– 7 mm. |
| 3 | 106–115° | 106–114° | 112–118° | 111–126° | 5 mm. |
| Vol. | 317 cc. | 304 cc. | 325 cc. | 395 cc. | Total 1341 cc. |

| | 1st Fraction. | 2nd Fraction. | 3rd Fraction. | 4th Fraction. |
|---|---|---|---|---|
| Sp. Gr. (27°) | 0.97014 | 0.97555 | 0.97579 | 0.97635 |
| Ref. Ind. (20°) | 1.5209 | 1.5231 | 1.5239 | 1.5240 |

All four fractions were optically inactive.

On account of the overlapping and lack of sharpness in the separation of the fractions, the whole quantity was subjected to redistillation under reduced pressure, making use of a special fractionating column, and heating by means of an oil-bath. The four portions, each made up by combining the three portions of like number from the previous distillation, were treated in the order in which they were collected. The original portions are designated by the Roman numerals I, II, III and IV, and the individual fractions are indicated by the appropriate combinations of Roman and Arabic numerals, as II,(2); III, (2), etc. The temperature range, pressure, volume, specific gravity and refractive index for each fraction are given in the table which follows. Gildemeister (3) found the following constants for carvacrol obtained from origanum oil: m. p. 0.5°; b. p. 235.5–236.2° (742 mm.); $d_{15°}$ 0.980; $d_{20°}$ 0.976; $n_D^{20°}$ 1.52238.

| | Temp. Range. | Pressure. | Volume. | Sp. Gr. at 20°. | Ref. Ind. at 20°. |
|---|---|---|---|---|---|
| I,(1) | 25–93° | 3 mm. | 12 cc. | 0.90439 | 1.4948 |
| I,(2) | 93–94° | 3 mm. | 153 cc. | 0.97531 | 1.5230 |
| I,(3) | 94–94.5° | 3 mm. | 118 cc. | 0.97601 | 1.5235 |
| II,(1) | 25–93° | 3 mm. | 15.5 cc. | 0.96580 | 1.5187 |
| II,(2) | 93–94° | 3 mm. | 261 cc. | 0.97543 | 1.5235 |
| III,(1) | 25–93° | 3 mm. | 15 cc. | 0.97475 | 1.5222 |
| III,(2) | 93–94° | 3 mm. | 296 cc. | 0.97631 | 1.5239 |
| IV,(1) | 25–93° | 3 mm. | 7 cc. | 0.97195 | 1.5225 |
| IV,(2) | 93–94° | 3 mm. | 368 cc. | 0.97631 | 1.5239 |

Fraction I,(1) was found to be optically active, the value $[\alpha]_D^{24°}$ being −1.658°.

MELTING POINTS OF THE PHENOL FRACTIONS.

| Fraction. | Solidified at: | Melted at: | |
|---|---|---|---|
| I,(1) | | | Mobile liquid at −12° |
| I,(2) | −5.0° | −2.0° | |
| I,(3) | −4.0° | 0.5° | |
| II,(1) | | | Viscid liquid at −12° |
| II,(2) | −4.0° | 0.5° | |
| III,(1) | | | Viscid liquid at −12° |
| III,(2) | −4.0° | 0.5° | |
| IV,(1) | | | Viscid liquid at −12° |
| IV,(2) | −4.0° | 0.5° | |

(3) Nitrosocarvacrol. The four fractions of phenol obtained from the smaller portion of the oil (224 cc.) by alkaline extraction and fractional distillation, 90.59 Gm., were dissolved in alcohol and treated with hydrochloric acid and sodium nitrite, according to the first step in the method of Kremers, Wakeman and Hixon (4) for the production of thymoquinone. The product, representing about 93 per cent of the theoretical yield, was a buff-colored substance, and gave, without recrystallization, a melting point of 152°. Upon recrystallization by dissolving in dioxan and precipitating by the addition of petroleum ether, bright lemon-yellow needles were formed which melted sharply at 153°. Klages (5) gives the melting point of nitrosocarvacrol as 153°.

### D. NON-PHENOL PORTION OF THE OIL.

The non-phenol portion obtained from the first experiment was distilled with steam, the 50 cc. of oil insoluble in 5 per cent sodium hydroxide solution yielding 38 cc. of oil, corresponding to 76 per cent recovery. There remained in the distilling flask a dark brown sticky residue. The oily distillate was lemon-yellow in color. $d_{32°} = 0.86802$; $n_{D^{26°}} = 1.4791$; $[\alpha]_{D^{29°}} = +1.152°$. As saponification values 30.88 and 32.65 were determined in two trials, corresponding to 10.80 and 11.42 per cent of ester computed as geranyl acetate.

Samples of the non-volatile residue left in the distilling flask were taken and the saponification value determined. Because of the deep brown color imparted to the solutions, it became necessary to dilute each sample very largely (approximately to two liters), add an excess of half-normal acid and titrate residually with tenth-normal sodium hydroxide solution. The values obtained were:

I. 79.76 II. 79.86

The non-phenol portion obtained from the 2000 cc. of oil, 450 cc. in volume, was, as before, very dark brown in color, and had a specific gravity of 0.90291 at 27°. Upon being distilled with steam, 315 cc. of a lemon-yellow liquid were obtained. This corresponds to a recovery of 70 per cent. The following constants were determined: $d_{24°}$ 0.97264; $n_{D^{26°}}$ 1.4806; $n_{D^{20°}}$ 1.4842; $[\alpha]_{D^{24°}}$ +0.759°. The aqueous distillate was cohobated, yielding 4 cc. of non-phenols.

The non-phenol portion obtained from the 2000 cc. of oil was tested with Schiff's reagent, and failed to restore the color of the fuchsin, except upon long standing. Two samples of 10 cc. each, when subjected to the acid sulphite method of assay for aldehydes, showed no diminution in volume, indicating that the non-phenol portion is aldehyde-free.

REFERENCES.

(1) The National Formulary, V, 370 (1926).

(2) Sherk, D. C. L., *Am. J. Pharm.*, 93, 16 (1921).

(3) Gildemeister, E., and Hoffmann, F., "Die Ätherischen Öle," Auf. III, Bd. I, s. 600 (1928).

(4) Kremers, E., Wakeman, N., and Hixon, R. M., "Organic Synthesis," VI, 92 (1926); Collective Volume I, 498 (1932).

(5) Klages, A., *Ber.*, 32, 1518 (1899).

---

## THALLIUM. XIII. SYMPTOMS AND SYSTEMIC ACTION ON CATTLE.*

JUSTUS C. WARD.[1]

In earlier papers in this series the effects of thallium on sheep and ducks have been presented (1, 2). The present discussion deals with several phases of thallium poisoning of cattle. Two major points will be noted: (1) the rate of acceptance of grain poisoned with thallium as the sulphate, and (2) the effects produced in the animals from graduated doses of the poison.

Interest in thallium has been increasing steadily since its discovery by Crookes (1861) and Lamy (1863). Many uses have been discovered (3), among which is its application in the control of many forms of noxious rodents (4).

Thallium is a very powerful, metallic poison, and its introduction into industrial, medicinal and economic poisoning uses presented the possible hazard of accidental poisonings. As with every powerful drug, some of these accidents have happened with thallium (5, 6, 7, 8).

Many investigators have studied various phases of thallium and its industrial and medicinal application. Reports on the pharmacology, pathology, histology and toxicology of the metal are common. Most of these, however, refer to accidental poisonings with questionable doses and involve studies on human beings where the thallium ingested was in the form of the rather readily soluble acetate. Exceptions to this are several studies made with the acetate on rats and dogs. No reference has been found in the literature to thallium effects on cattle where the sulphate was the form in which the poison was administered and where the animals were deliberately treated with measured doses for experimental purposes.

In our experiments we used a specially prepared bait containing 15 mg. of thallium, as the sulphate, for each Gm. of bait. The bait was made in this strength so that a certain lethal dose would be carried on the amount of grain a cow would readily eat at one time. As a point of practical interest it might be stated that standard ground squirrel poison contains 8.00 mg. thallium per Gm. of bait.

Early in February 1935, a coöperative experiment was undertaken with Dr. I. E. Newsom and Dr. B. R. McCrory, of the Department of Veterinary Pathology of the Colorado State College of Agriculture, at Fort Collins, Colorado. Dr. Newsom donated for our use four animals—one adult Ayreshire cow and three yearling heifers, which were temporary reactors for anaplasmosis. When they were used for our purpose, however, there was no evidence of any physical de-

---

* Scientific Section, A. PH. A., Portland meeting, 1935.

[1] Control Methods Research Laboratory, Bureau of Biological Survey, Denver, Colorado.

rangement. It is appreciated that normal animals might be quantitatively more resistant to the action of thallium. Brief case histories will be given of these animals.

*Animal No. 1.*—Ayreshire cow, age, three years; weight, 847 lbs. (375 Kg.).

Animal was not given food for 24 hours, then fed 2 lbs. 12.2 oz. of the thallium-poisoned grain. This amount of bait carried a dose of 50 mg. Tl per Kg. body weight. The acceptance was good and the feed was gone in 7 minutes. Animal fed at 2:34 P.M., Feb. 7, 1935.

Feb. 8, 1935, 4:00 P.M. Noticeably depressed. Cow lying with head on abdomen. Frequent defecation of small quantities of bloody feces.

Feb. 9, 1935, 8:30 A.M. Muscular twitching of flank, rump and loin on being forced to move. Small quantities of urine and feces voided. Drooling, frequent swallowing and muscular twitching. No appetite.

Feb. 10, 1935, 10:00 A.M. Symptoms of Feb. 9, aggravated. Gautness appearing.

Feb. 11, 1935, 8:45 A.M. and 3:00 P.M. Profuse drooling of stringy mucous from nose and mouth. Anal mucous tinged with blood.

Feb. 12, 1935, 8:00 A.M. Animal found dead.

POST MORTEM.

Fifty mg./Kg. Death in 5 days. Laryngitis, tracheitis, bronchitis; lungs normal; few hemorrhages under epicardium; rumen contained alfalfa and some of the poisoned oats; omasum blotchy hemorrhagic areas with ulceration; abomasum showed hemorrhagic ulcerative gastritis; duodenum highly pigmented with a melanin-like pigment; few small hemorrhagic areas and three small ulcers. The rest of intestinal tract showed petechial type hemorrhages; whole digestive tract was toneless as is found in paralysis cases.

The liver was congested. The kidneys were soft and almost flabby, markedly congested throughout structure. The bladder mucosa was congested. All lymph nodes were congested and edematous. Other organs appeared normal.

*Animal No. 2.*—Holstein heifer, age, 15 months; weight, 250 lbs. (127 Kg.).

Fasted 24 hours and then was fed 10.5 oz. of thallium-poisoned grain carrying a dose of 35 mg./Kg. Bait offered animal at 2:45 P.M., February 7, 1935. Accepted fairly readily.

No marked symptoms appeared until Feb. 11, 1935, at 8:30 A.M. On this date the animal had nasal discharge of stringy mucous and marked drooling. Muscular twitching and marked stretching.

Feb. 12 to Feb. 17, 1935, increased and deepening depression. Comatose on afternoon of 17th.

Feb. 18, 1935. Found dead at 7:45 A.M.

POST MORTEM.

Thirty-five mg./Kg. Death in 11 days. Considerable alfalfa in rumen; also some of the oats from the poison dose of the 6th; rumen lining and reticulum normal; abomasum showed ulceration at pyloric end, congestion and a croupous exudate. The duodenum showed marked ulceration with one ulcer 2 x 3 cm. deep in muscle tissue. From abomasum to cæcum there was an extensive croupous exudate. Intestinal tract practically empty from abomasum to rectum. Lymph nodes of intestines congested and edematous.

Kidneys: No hemorrhages on surface. Cut cortex congested. Parenchymatous degeneration very evident in both kidneys. These structures were soft and semi-pulpy.

Heart, lungs, peritoneum, pleura, normal. Liver, pale but firm. Spleen, pale but firm. Other tissues, normal.

*Animal No. 3.*—Holstein black heifer, age, 1 year; weight, 300 pounds (136 Kg.).

Fasted 24 hours and then was fed 8 ounces of thallium-poisoned grain, carrying a dose of 25 mg./Kg. Animal ate only a very little of the bait, so the rest was loaded into capsules and administered with a balling gun. Bait taken by 2:30 P.M., Feb. 7, 1935.

Symptoms were similar to those of animal No. 2, the only major differences being in rate of onset and intensity. Death followed a period of coma. Animal was found dead at 7:30 A.M., Feb. 21, 1935.

POST MORTEM.

Twenty-five mg./Kg. Death in 14 days. This animal showed an almost identical post mortem with No. 2. Ulceration and marked inflammation from abomasum to rectum. No fecal material, indicating a paralyzed intestinal tract. Other organs similar to those of No. 2.

*Animal No. 4.*—Brindle heifer, age, 18 months; weight, 420 pounds (191 Kg.).

Fasted 24 hours then was fed 6½ ounces of thallium-poisoned grain, carrying a dose of 15 mg./Kg. The animal ate about half the bait in 30 minutes. The balance was force-fed in capsules with a balling gun. Bait taken by 2:50 P.M., Feb. 7, 1935.

Typical symptoms of thallium started on February 10th. Bloody feces, drooling of a stringy mucous, stretching, constipation, loss of appetite and general debility evidenced by gauntness. This condition remained until Feb. 25th when marked improvement started. There was a hair loss in the tail switch, but little elsewhere. This might have been from other causes. Animal was normal by March 10th.

On April 17th this animal was given a dose of 20 mg./Kg. of thallium on poisoned grain. Bait was taken voluntarily within an hour. Dose given at 10:45, April 17, 1935.

Symptoms developed more rapidly than before. Albuminuria showed up in addition to the gross appearance. From April 19th to May 6th the animal was in very bad shape, with all the described symptoms of thallium. On the 6th, however, the condition was noticeably better, and the animal was recovering rapidly by May 10th.

On May 11, 1935, at 9:00 A.M., the animal was given a dose of 35 mg./Kg. on grain, as before. Animal would not eat, so the dose was given by balling gun in capsules. Thallium symptoms developed immediately, and the animal was failing rapidly when it was destroyed at noon on May 14, 1935, for autopsy.

POST MORTEM.

Fifteen mg./Kg., Feb. 7, 1935; 20 mg./Kg., April 17, 1935; 35 mg./Kg., May 11, 1935. Destroyed for autopsy three days after third dose.

Eyes normal; oral membranes inflamed; submaxillary lymph nodes edematous and congested; pharynx and larynx reddened but no ulceration; parotid lymph nodes edematous; inferior cervical lymph node edematous; thyroid and parathyroid normal; thymus, adrenals, pancreas and ovaries normal; mesenteric lymph nodes edematous and swollen; lungs, heart, spleen and bladder all normal; kidneys congested cortex and few petechial hemorrhages; rumen and omasum normal; abomasum and duodenum highly inflamed; small intestine had areas of inflammation; spinal cord, brain and optic nerve appeared normal.

HISTOPATHOLOGY.

In general, the most definite pathological changes are found in the lymphatics, the liver and kidneys, and the walls of the digestive tract.

RESPIRATION RATES IN CATTLE POISONED WITH THALLIUM AS THE SULPHATE.

| | Dose, 50 Mg./Kg. | | Dose, 35 Mg./Kg. | | Dose, 25 Mg./Kg. | | Dose, 15 Mg./Kg. | |
|---|---|---|---|---|---|---|---|---|
| Day. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. |
| 1st | 20 | .. | 27 | .. | 25 | .. | 24 | .. |
| 2nd | 20 | .. | 30 | .. | 25 | .. | 18 | .. |
| 3rd | 15 | .. | 18 | .. | 18 | .. | 20 | .. |
| 4th | 20 | 28 | 22 | 21 | 20 | 15 | 21 | 21 |
| 5th | Dead | | 14 | 16 | 16 | 12 | 13 | 13 |
| 6th | | | 18 | 10 | 13 | 13 | 12 | 11 |
| 7th | | | 12 | 12 | 9 | 11 | 9 | 12 |
| 8th | | | 11 | 11 | 14 | 10 | 10 | 11 |
| 9th | | | 14 | 12 | 10 | 11 | 10 | 11 |
| 10th | | | 10 | 12 | 15 | 13 | 12 | 14 |
| 11th | | | Dead | | 15 | 12 | 10 | 10 |
| 12th | | | | | 13 | 10 | 10 | 11 |
| 13th | | | | | 11 | 27 | 8 | 12 |
| 14th | | | | | Dead | | Survived* | |

* This animal was subsequently given two additional doses of thallium, and was finally sacrificed for pathological studies.

No pathological change was detected in the brain, the spinal cord, the optic nerve or the eyeball.

Records were made once, and often twice, daily of rectal temperatures, pulse and respiration rates for each animal studied. No consistent effect could be detected on either the temperature or pulse rate. There was, however, a decided depressing influence on the respiration rate in some cases. This symptom appeared usually within two or three days, and persisted until the asphyxial rise shortly before death. The table illustrates this trend.

## CONCLUSIONS.

1. Thallium-sulphate-poisoned steam-rolled oats may be taken in lethal quantities by cattle when this bait is fed after a 24-hour period of fasting.

2. The minimum lethal dose for cattle is approximately 25 mg. of Tl/Kg. of body weight.

3. There is no consistent effect on temperature or pulse, but respiration is depressed.

4. A 25-mg./Kg. lethal dose would imply that an 800-pound cow would have to eat 2 pounds 8 ounces of a bait containing 8 mg. Tl/Gm. to kill. Normal infestation of ground squirrels or prairie dogs requires less than one pound of bait to the acre. This means the cow would have to pick up all the exposed grain from more than 2 acres to get a killing dose.

Considering the fact that the rodents accept thallium-poisoned bait quite readily, and as a consequence remove a large percentage of the bait from the surface of the ground, it would seem a very remote possibility that cattle could be accidentally poisoned on areas where the thallium-poisoned grain had been properly exposed for rodent control.

## REFERENCES.

(1) Ward, Justus C., "Thallium Poisoning in Sheep," JOUR. A. PH. A., 19, 556 (1930).

(2) Ward, Justus C., "Thallium Poisoning in Migratory Birds," *Ibid.*, 20, 1272 (1931).

(3) Munch, J. C., "Recent Developments in the Use of Thallium," Foote Prints 6, No. 1 (1933).

(4) Munch, J. C., and Silver, James, "Pharmacology of Thallium and Its Use in Rodent Control," U. S. Dept. of Agr., Bull. 238 (April 1931).

(5) Lynch, G. R., and Scovell, J. M. S., "Toxicology of Thallium," *Lancet*, 1340 (December 20, 1930).

(6) Ginsburg, H. M., and Nixon, C. E., "Thallium Poisoning," *J. A. M. A.*, 98, 1076 (1932).

(7) Munch, J. C., Ginsburg, H. M., and Nixon, C. E., "The 1932 Thallotoxicosis Outbreak in California," *Ibid.*, 100, 1315 (1933).

(8) Munch, J. C., "Human Thallotoxicosis," *Ibid.*, 102, 1939 (1934).

(9) Dudits, A., "Thallium Poisoning," *Magyar Orvosi Arch.*, 32, 249 (1931).

(10) Schneider, Phillip, "Anatomical Findings in Protracted Thallium Poisoning," *Deut. Z. ges. gerichtl. Med.*, 14, 555 (1930).

(11) Hesse, Erich, "Thallium," *A. Heffter Handbuch der Exper. Pharm.*, Vol. 3, Part 3, 2177–2186 (1934).

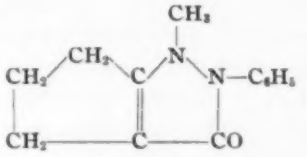
(12) Buschke, A., "Über Gewerbliche Thalliumvergiftungen," *Med. Klin.*, 27, 1 (1928).

(13) Buschke, A., and Peiser, Bruno, "Die biologischen Wirkungen und die praktische Bedeutung des Thalliums," *Ergebnisse der Pathologie*, 25, 1 (1931).

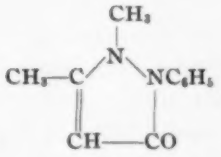
# THE PREPARATION AND PHYSIOLOGICAL PROPERTIES OF SOME 2-PHENYL-4,5,6,7-TETRAHYDRO-INDAZOLONES.*

BY JOHN LEE AND W. G. CHRISTIANSEN.[1]

Mannich (1) has reported that 1-methyl-2-phenyl-4,5-cyclotrimethylene-pyrazolone-3 (I) and a methyl derivative have antipyretic activity superior to that of antipyrine (II)



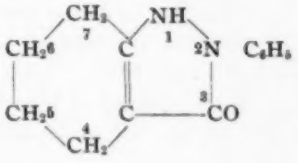
(I)



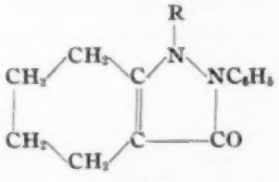
(II)

It was therefore of interest to prepare the analogous cyclotetramethylene derivatives, and since the cyclohexane nucleus forms a part of such physiologically active compounds as cardiazole and hexatone, an increase in the antipyretic effects would be expected. This was found to be the case.

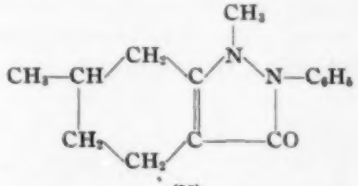
The compounds prepared were derivatives of 2-phenyl-4,5,6,7-tetrahydro-indazolone-3 (III)



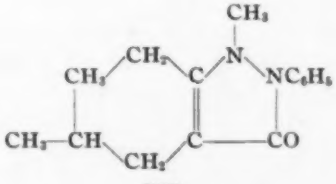
They are shown by graphic formulas (IV), (V), (VI), (VII).



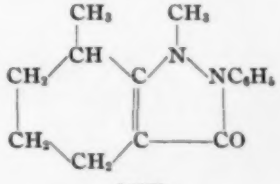
(IV)



(V)



(VI)

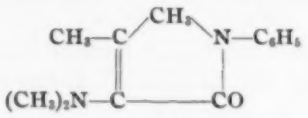


(VII)

* Scientific Section, A. PH. A., Washington meeting, 1934.

[1] Research Department of the Chemical and Pharmaceutical Laboratories, E. R. Squibb and Sons, Brooklyn, N. Y.

As expected, the compounds displayed marked antipyretic activity, but insufficient to warrant further development. The activity proved to be about four times that of antipyrine (II), but only 50–60% as great as that of pyramidon (VIII),



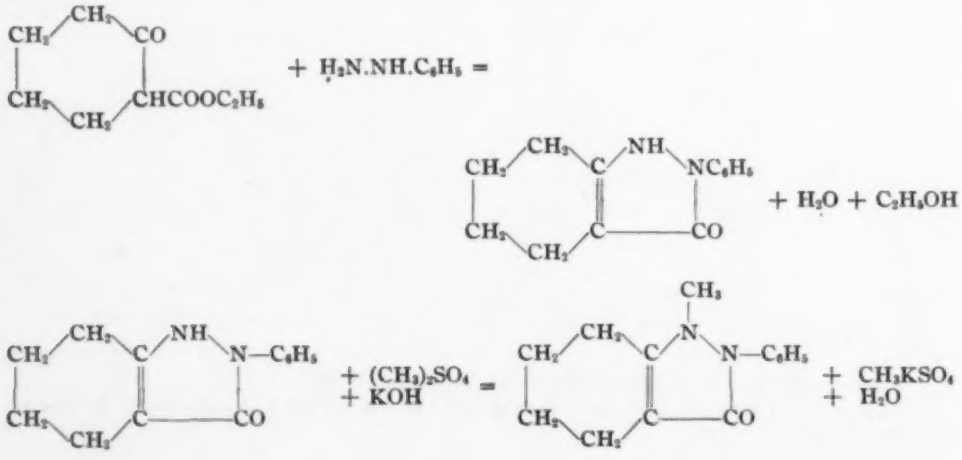
(VIII)

when tested with those two substances as controls. There were no major differences between individual compounds of the series, with the exception of IV (*c*), which was only about 15% as active as pyramidon. Further, the effectiveness in all cases varies considerably in successive tests. The variations are attributed to low solubility and consequent irregular absorption.

| Toxicity. | M. L. D. Mg./Kg. | |
|---|---|---|
| 1. Oral, single dose: | Rats. | Mice. |
| Pyramidon | 900 | 500 |
| IV(*a*) | 825 | 700 |
| IV(*b*) | ..... | 900 |
| V | ca. 800 | ... |
| VI | ca. 800 | ... |

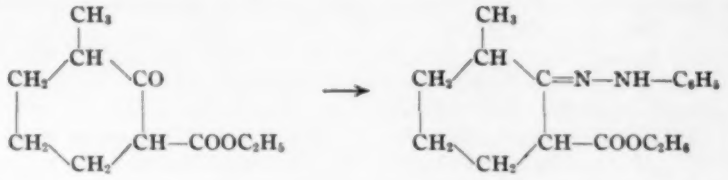
2. Repeated dosage at 500 mg./Kg.: IV(*a*) and pyramidon were compared. Both were non-cumulative. Based on mortality, weight changes and autopsy, IV(*a*) is hardly as well tolerated as pyramidon. There is slightly more liver damage with IV(*a*) than pyramidon, but excretion of bloody urine which occurred with pyramidon was not observed with IV(*a*). The effect on the vital organs is, on the whole, comparatively slight.

The preparation of these compounds was accomplished by alkylating the secondary nitrogen atom of the 2-phenyl-4,5,6,7-tetrahydroindazolones, which in turn were prepared by the action of phenylhydrazine upon ethyl cyclohexanone carboxylic esters. The reactions are illustrated in detail for the preparation of 1-methyl-2-phenyl-4,5,6,7-tetrahydroindazolone-3.



The desired indazolones were obtained with little difficulty in most cases but the yields were uniformly poor, as will be noted in the experimental part.

In one case, the reaction between phenylhydrazine and ethyl-3-methylcyclohexanone-2 carboxylate failed to yield the indazolone, the product being the phenylhydrazone.



The hydrazone was converted to the indazolone by treatment with sodium but owing to the low yield methylation was not attempted.

## EXPERIMENTAL.

*Preparation of Methyl-2-Phenyl-4,5,6,7-Tetrahydro-Indazolone-3.*—10.7 Gm. 2-phenyl-4,5,6,7-tetrahydro-indazolone-3 (2) was dissolved in a solution of 5.6 Gm. KOH in 30 cc. water and cooled in a freezing mixture. Eight grams dimethyl sulfate were added during one hour with stirring. The solution was boiled for 15 minutes to remove excess dimethyl sulfate, then cooled and extracted with ether. The ether solution was dried with sodium sulfate, distilled off and the residue distilled *in vacuo*. The fraction of b. p. 208–210°/4 mm. weighed 4.6 Gm. When recrystallized from a mixture of ether and petroleum ether and finally from *n*-hexane it formed needles, m. p. 105.5–106.5° C.

Analysis: Found—N, 12.84%; calculated for $C_{14}H_{16}N_2O$—N, 12.84%.

*Preparation of 1-Ethyl-2-Phenyl-4,5,6,7-Tetrahydro-Indazolone-3.*—Thirty grams 4,5,6,7-tetrahydro-indazolone-3 dissolved in a solution of 16.7 Gm. KOH in 80 cc. water was ethylated at 12° C. by means of 29.8 cc. diethyl sulfate. An oily precipitate which formed after refrigeration was extracted with ether. After drying, the ether was distilled off and the residue distilled *in vacuo* up to 200°/3 mm. The residue was repeatedly extracted with *n*-hexane. The 800 cc. of hexane solution was evaporated down and cooled, yielding 7 Gm. of colorless crystals, m. p. 108–110° C.

Analysis: Found—N, 12.10%; calculated for $C_{15}H_{18}N_2O$—N, 11.57%.

*Preparation of 1,6-Dimethyl-2-Phenyl-4,5,6,7-Tetrahydro-Indazolone-3.*—Eleven and four-tenth grams 6-methyl-2-phenyl-4,5,6,7-tetrahydro-indazolone-3 (3) were methylated in alkaline solution at 12° C. by means of 8 Gm. of dimethyl sulfate exactly as in the previous examples. The product was precipitated from the ether solution by petroleum ether and recrystallized from *n*-hexane as colorless tablets, m. p. 105–106° C.

Analysis: Found—N, 12.05%; calculated for $C_{15}H_{18}N_2O$—N, 11.57%.

*Preparation of 1,5-Dimethyl-2-Phenyl-4,5,6,7-Tetrahydro-Indazolone-3.* (*a*) *2-Phenyl-4,5,-6,7-Tetrahydro-Indazolone-3.*—Eight and eight-tenths grams ethyl-3-methyl-cyclohexanone-6 carboxylate (4) were warmed for 3 hours on the water-bath with 11.1 Gm. phenylhydrazine. The solid mixture was washed with ether and recrystallized from methyl alcohol.

Yield—18.8 Gm., m. p. 198–201° C.

Analysis: Found—N, 12.4%; calculated for $C_{14}H_{16}N_2O$—N, 12.27%.

(*b*) *Methylation.*—Eighteen and six-tenths grams 2-phenyl-4,5,6,7-tetrahydro-indazolone-3 was methylated as previously described, and the product crystallized from ether, and finally from *n*-hexane in rosettes of colorless needles.

Yield—6 Gm., m. p. 110–110.5° C.

Analysis: Found—N, 11.57%; calculated for $C_{15}H_{18}N_2O$—N, 11.57%.

*Preparation of 7-Methyl-2-Phenyl-4,5,6,7-Tetrahydro-Indazolone-3:* (*a*) *Phenylhydrazone of Ethyl-3-Methyl-Cyclohexanone-2 Carboxylate.*—Thirteen and six-tenths grams ethyl-3-methyl-cyclohexanone-2 carboxylate (5) were warmed for several hours on the water-bath with 8 Gm.

phenylhydrazine. After cooling, a little alcohol and an excess of ether were added. The crystalline precipitate was recrystallized from aqueous alcohol.

Yield—11.6 Gm., m. p. 136–138° C.

Analysis: Found—N, 10.60%; Calculated for $C_{16}H_{22}N_2O_2$—N, 10.22%.

(*b*) Five and five-tenths grams of the phenylhydrazone were dissolved in 15 Gm. toluene and 0.54 Gm. sodium was added. After refluxing for five hours, water was cautiously added and the aqueous layer acidified with HCl. The gummy precipitate was recrystallized from benzene.

Yield—1.3 Gm., m. p. 176° C.

Analysis: Found—N, 12.40%; calculated for $C_{14}H_{16}N_2O$—N, 12.27%.

*Preparation of 1-β-Bromoallyl-2-Phenyl-4,5,6,7-Tetrahydro-Indazolone-3.*—Ten and seven-tenths grams 2-phenyl-4,5,6,7-tetrahydro-indazolone-3 was dissolved in 30 cc. absolute alcohol containing 1.15 Gm. sodium in solution. After cooling, 10 Gm. 2,3-dibromopropene were slowly added at 20° C. After standing over night the alcohol was distilled off under reduced pressure. Water was added to dissolve the sodium bromide and the oily product extracted with ether. The dried ether solution was evaporated and the residue repeatedly extracted with *n*-hexane. After evaporation of the hexane there remained a straw-colored viscous liquid which would not crystallize, and which decomposed during distillation at the highest vacuum obtainable (0.5 mm.).

Yield—11.3 Gm. of an oily product.

Analysis (Parr Bomb): Found—Br, 25.35%; calculated for $C_{16}H_{17}N_2OBr$—Br, 24.02%.

SUMMARY.

Some 2-phenyl-4,5,6,7-tetrahydro-indazolone-3 substitution products have been prepared. They were found to possess definite antipyretic activity and moderate toxicity.

REFERENCES.

(1) Mannich, *Arch. der Pharm.*, 267, 699 (1929).
(2) Dieckmann, Ann., 320, 102 (1902).
(3) Kotz, *Ibid.*, 342, 21 (1905).
(4) Kotz and Michels, *Ibid.*, 348, 95 (1906).
(5) Kotz and Michels, *Ibid.*, 348, 94 (1906).

---

## THE ABSORPTION OF CERTAIN DRUGS FROM THE HUMAN SKIN.*[1]

BY A. RICHARD BLISS, JR.[2]

The results obtained during the initial period of these investigations have been briefly described in previous announcements and reports (1, 2, 3). The completed study, discussed in this paper, confirms the findings of the preliminary studies.

### HISTORICAL.

From time immemorial, salves, ointments, skin creams and lotions, liniments and plasters, consisting chiefly of fatty, greasy and oily substances, have been used by man as medicaments and as cosmetics. The fats of the crocodile, cat, hippopotamus, horse and snakes were valued in ancient Egypt as agents of pronounced medicinal virtue; goose grease and olive oil were prized by the earliest Egyptians and Chinese; and Hippocrates himself made and used salves (4).

---

* Scientific Section, A. PH. A., Portland meeting, 1935.

[1] Contribution from the Research Laboratories of the Reelfoot Lake Biological Station, Reelfoot Lake, Tennessee; and The Laboratories of Pharmacology, Howard College of Birmingham, Alabama.

[2] Director of the Reelfoot Lake Biological Station; Professor of Pharmacology and Dean of the School of Pharmacy, Howard College of Birmingham, Alabama.

Lard, however, seems to have been almost universally employed, and was the fatty vehicle most widely used by the ancients (5).

The ancient prescribers employed their fatty and oily preparations for three major purposes; *viz.*, (I) superficial action, (II) effects in the skin alone and (III) penetration of the skin and subsequent effects on internal structures. In medical practice today, as well as in the field of cosmetics, these three old objectives are continued, and the demand persists for ointment vehicles which are capable of inducing epidermic, endermic and diadermic actions.

Wild (6) was one of the first modern investigators to study the protective and penetrating powers of ointment vehicles. He applied the vehicles by rubbing in accurately weighed quantities over definite areas for fixed times. The vehicle which remained on the skin and on the rubbing finger was carefully scraped off and weighed, and by difference the amount of the vehicle actually rubbed in was determined. He found that petrolatum and paraffin were practically unabsorbed; that about 15 per cent of the lard and of the olive oil were absorbed after two minutes rubbing; and that about 20 per cent of the hydrous wool fat was absorbed if water was present in adequate amount. The results obtained with anhydrous wool fat were unreliable because of the tenacity of this vehicle.

Wild's findings possibly represent the basis of the medical and pharmaceutical instruction during the past quarter of a century which teaches that there are three classes of ointment vehicles; *viz.*, (A) those which act superficially; *example*, petrolatum; (B) those which practically affect the skin only; *example*, lard; and (C) some which penetrate the skin; *example*, hydrous wool fat; further, that careful discrimination ought to be observed in the choice of an ointment vehicle, the selection in each case to be governed by the objective. Then, if the medicinal agent incorporated in the ointment vehicle is intended for systemic action, prescribe hydrous wool fat as the inunction vehicle; if the effects of the medicament are to be limited to the skin alone, use lard; and if superficial effect only is desired, call for petrolatum. The conclusion reached, apparently, was that if the vehicle is absorbable, then a medicinal agent incorporated with that vehicle and applied by inunction would be, of necessity, absorbed too, and vice versa.

Modern medical literature presents many contradictions concerning the absorbability of various ointment vehicles and of medicinal agents incorporated with them (7 through 11). The studies herewith reported were undertaken in an attempt to clarify the confusion which patently exists concerning the probabilities of absorption of certain common and important drugs when applied to the human skin by inunction or by painting. McCord (12) pointed out recently the inadequacy of the available data from the standpoint of industrial diseases.

## THE MEDICINAL AGENTS USED.

The *ointment vehicles* employed were *petrolatum*, *lard* and *hydrous wool fat*.

The *drugs* used included *methyl salicylate*, in the form of 25 per cent ointments, made with the three vehicles; *iodine*, in the form of U. S. P. VII tincture (13), the U. S. P. X compound solution (aqueous) (14), and three ointments, each of which contained 4 per cent of iodine, 4 per cent of potassium iodide, and 6 per cent of distilled water; *potassium iodide*, in the form of three 25 per cent ointments, those made with lard and with hydrous wool fat containing also 20 per cent of distilled water, and that made with petrolatum containing 12 per cent of distilled water and 20 per cent of glycerin; and *quinine hydrochloride*, in the form of three 25 per cent ointments similar in basic composition to the potassium iodide preparations.

## THE TECHNIQUE.

Forty-three *human subjects* were used. They were divided into groups, each having the same number of persons of the two sexes, complexions and age ranges.

The *ointments* were applied by inunction, the sites of application in order being the inner surface of the right thigh, the inner surface of the left thigh, the inner surface of the right arm, and the inner surface of the left arm. The sites of application were first thoroughly scrubbed with soap and hot water and dried; then alcohol was applied and the area again thoroughly dried.

Ten grams of ointment were rubbed in with the finger tips for thirty minutes four times during one day, the residue being completely removed after each inunction. The first application was started at 5:30 A.M.; the second four hours after the first inunction; and the third and fourth at the eighth and the twelfth hours.

TABLE I.*

| First Day. | | Methyl Salicyl. Ointments. Pet. | Lard. | Wool Fat. | Iodine Ointments. Pet. | Lard. | Wool Fat. | Tinct. of Iodine. |
|---|---|---|---|---|---|---|---|---|
| 5:30 to 6:00 A.M. | 1st Applic. | | | | | | | |
| 6:30 | urine spec. | n[1] | tr[2] | n | n | n | n | n |
| 7:00 | " | tr | p[3] | tr | n | n | n | n |
| 8:00 | " | p | p | p | n | n | n | n |
| 9:00 | " | p | p | p | n | n | n | n |
| 9:30 to 10:00 | 2nd Applic. | | | | | | | |
| 10:00 | urine spec. | p | p | p | n | n | n | n |
| 11:00 | " | p | p | p | n | n | n | n |
| 12:00 NOON | " | p | p | p | n | n | n | n |
| 1:00 P.M. | " | p | p | p | n | n | n | n |
| 1:30 to 2:00 | 3rd Applic. | | | | | | | |
| 2:00 | urine spec. | p | p | p | n | n | n | n |
| 3:00 | " | p | p | p | n | n | n | tr |
| 4:00 | " | p | p | p | n | n | n | p |
| 5:00 | " | p | p | p | n | tr | n | p |
| 5:30 to 6:00 | 4th Applic. | | | | | | | |
| 6:00 | urine spec. | p | p | p | n | tr | n | p |
| 7:00 | " | p | p | p | n | tr | n | p |
| 8:00 | " | p | p | p | tr | tr | tr | p |
| 9:00 | " | p | p | p | tr | tr | n | p |
| 10:00 | " | p | p | p | n | tr | n | p |
| 12:00 MIDNIGHT | " | p | p | p | n | n | n | p |
| Second Day. | | | | | | | | |
| 6:00 A.M. | " | p | p | p | n | n | n | p |
| 12:00 NOON | " | p | p | p | n | n | n | p |
| 6:00 P.M. | " | p | p | p | n | n | n | p |
| 12:00 MIDNIGHT | " | p | p | p | n | n | n | p |
| Third Day. | | | | | | | | |
| 6:00 A.M. | " | p | p | p | n | n | n | tr |
| 12:00 NOON | " | tr | p | tr | n | n | n | n |
| 6:00 P.M. | " | tr | tr | tr | n | n | n | n |
| 12:00 MIDNIGHT | " | n | tr | n | n | n | n | n |
| Fourth Day. | | | | | | | | |
| 6:00 A.M. | " | n | n | n | n | n | n | n |

*** Note: The aqueous solution of iodine, the potassium iodide ointments, and the quinine hydrochloride ointments gave negative results throughout the investigation.**

[1] = negative; [2] = trace; [3] = positive.

The *Tincture of Iodine* and the *Compound Solution of Iodine* were painted over the areas in single doses of 1.5 cc., with the aid of a camel's hair brush, the frequency of dosage and the sites of application being the same as with the ointments.

Since all of the drug agents employed are eliminated, at least in part, in the urine and are readily detected therein, the *presence in the urine* of the drugs or of their derivatives was accepted

as the *criterion of absorption*. Each subject's urine was checked for several days before the applications were started, and dietary control prevented errors from that source. Specimens of urine were collected and tested qualitatively during a period of 72 hours at the intervals shown in Table I. Twenty-four hour collections were made for the quantitative determinations.

The *qualitative tests* employed were the procedures of Sollmann (15) for the presence of salicylates and of iodides, and the method of Ramsden and Lipkin (16) for quinine. *Quantitative determinations* were made by Robert's method (17) for salicylic acid, the standard solutions being changed from 1–1000 to 1–2000 and 1–3000 to insure greater accuracy in comparisons. The method of the Association of Official Agricultural Chemists (18) was used for the determination of iodides. No quantitative method for quinine was required, because of the negative results obtained with that drug.

## THE RESULTS—QUALITATIVE.

*1. Methyl Salicylate.*—The results obtained with the three 25 per cent methyl salicylate ointments, made with petrolatum, lard and hydrous wool fat, are tabulated in Table I. The absorption of this drug from the skin is fairly rapid, salicylate having appeared in the urines thirty minutes to one hour after the initial applications, and continuously thereafter into the third day. About one hour after each subsequent inunction an increase in the intensity of the qualitative test was observed. This was especially true following the third and fourth applications of the ointments.

The lard ointment yielded a trace of salicylate in the urines thirty minutes after the first application, and the positive reactions persisted for a period of seventy-five and one-half hours; whereas the petrolatum and the hydrous wool fat ointments showed positive reactions one hour after the initial inunction, and persisting reactions for a total period of fifty-nine hours. Although measurable, this difference is of no therapeutic importance.

The results recorded are the average results for three groups each of twelve subjects. Individual results are omitted in order to conserve space. The maximum individual variation from the averages was less than 10 per cent.

*II. Iodine Ointments.*—Each iodine ointment contained 4 per cent of iodine and 4 per cent of potassium iodide. Only traces of iodide were found in the urines, and these for but a short period. The lard ointment gave the first trace three hours after the third inunction. Traces persisted with this ointment through the fourth hour after the fourth application, a total of five hours. Six hours after the fourth inunction all urines were negative.

The petrolatum ointment gave its first reaction in the urines two hours after the fourth inunction, and these traces lasted during only two hours; while the wool fat ointment produced one trace only, and that two hours after the last inunction. Here again the lard ointment displayed a slight advantage, but of such slight degree as to make it of no practical value. The values tabulated are the averages for three groups each of twelve subjects, none of whom showed a variation from the averages greater than 6 per cent.

*III. Tincture of Iodine.*—One hour after the third application of the tincture, which contained no potassium iodide, the first trace of iodide made its appearance in the urines; this was about nine hours after the initial painting. Two hours after the third application, the first decided iodide reactions were obtained, and these persisted during thirty-two hours, with a trace still observable during six additional hours, a total period of thirty-nine hours.

The tabulated results represent the averages of a group of twelve subjects, and the maximum variation from the average in this series was but 4 per cent.

Most of the subjects showed a persistent local irritation after the third application of the tincture. This was true also with the ointments of iodine, but the action was much more mild with the lard ointment, even less with the petrolatum, and slight with the wool fat preparation.

*IV. Compound Solution of Iodine.*—This aqueous solution, which contains approximately 5 per cent of iodine and 10 per cent of potassium iodide, failed to yield any traces of iodide in the urines of a group of twelve subjects.

*V. Potassium Iodide Ointments.*—Iodide was absent in the urines of three groups, each of twelve subjects, following inunctions with 25 per cent potassium iodide ointments made with the three vehicles.

*VI. Quinine Hydrochloride Ointments.*—Four inunctions with twenty-five per cent quinine hydrochloride ointments, made with the petrolatum, lard and hydrous wool fat, failed to produce any traces of the alkaloid in the urines of three groups, each of twelve subjects.

## THE RESULTS—QUANTITATIVE.

*I. Methyl Salicylate.*—Twenty-four hour urines, collected during the four-inunction period with the three 25 per cent ointments, gave the following results:

TABLE II.

| | Ointment Vehicles. | Yield Calculated as Salicylic Acid. |
|---|---|---|
| 1. | Lard | 0.291 Gm. |
| 2. | Petrolatum | 0.279 Gm. |
| 3. | Hydrous Wool Fat | 0.268 Gm. |

These values represent the averages of three groups, each of twelve subjects. The maximum individual variation from the averages was not quite 8.74 per cent.

*II. Tincture of Iodine.*—The twelve 24-hour urine collections, following the four applications of the tincture, as before, gave an average of 0.0106 Gm. of iodine. The maximum variation from average was 5 per cent.

*III. Iodine Ointments.*—The traces of iodine, found in the urines following the iodine ointment inunctions, were so small as to defy accurate quantitative determinations.

Negative qualitative results eliminated quantitative procedures with the aqueous solution of iodine, the ointments of potassium iodide and the ointments of quinine hydrochloride.

## DISCUSSION.

The degree of penetration of the skin by various substances determines the effects produced. The major defense of the human skin against penetration is found in its physical structure. The protection afforded by the highly compact layers of stratified squamous epithelium, a stratum of keratinized cells, and the coating of fairly water-proof sebum is obvious. The intact human skin offers almost perfect protection against brief contact of aqueous solutions. Prolonged maceration by moist warm applications partially breaks down this defense, and the macerated skin surface absorbs much more readily than the dry skin.

The lining of the sebaceous glands of normal human skin constitutes practically the only living cell layer through which substances may be absorbed when applied to the skin. Due to the fact that these glands are filled with fat, penetration into or through the skin is limited, apparently, to fats, greases and oils, fat-soluble and fat-solvent substances, and hydrophil bodies incorporated with fatty vehicles.

Inunction, which forces the material into the ducts of the sebaceous glands, hyperæmia of the area induced by heat, friction or irritation, occlusive dressings, and the preliminary removal of sebum by scrubbing with soap and warm water materially aid penetration. If the dead horny layer of the skin is removed or its continuity interrupted, absorption takes place through it more readily, possibly almost as well as through mucous membranes.

Softening the layers of the epidermis increases the size of the interstices between cells, and may thus facilitate penetration. Although the major reason fatty substances favor penetration is their miscibility with the fatty secretion of the sebaceous glands, this power may be due in part also to the fact that they prevent the evaporation of sweat, and thus favor maceration and softening of the skin. The site of application is another factor which undoubtedly influences penetration, the best being areas where the skin is thin, as free from hair as possible, and richly supplied with lymphatics, as on the flexor surfaces of the body.

Of the drugs investigated, methyl salicylate is the agent absorbed most rapidly and in greatest amount. This may be true because it is the most volatile of the liquids used; produces itself a prolonged, though mild, hyperaemia; does not chemically react locally with the proteins; is possibly more soluble in the sebaceous secretion than in the vehicles used; and does not interfere with the softening or macerating tendencies of the ointment vehicles. The very slight advantage displayed by the lard ointment may be due to a lesser solvent power for the drug; increased penetration power; and the greater softening action of the lard as compared with the petrolatum and wool fat. The last characteristic was observed by a majority of the subjects who collaborated in these investigations.

These observations correct the more or less generally accepted text and reference book statements that drugs are most rapidly absorbed from the skin if applied as an hydrous wool fat ointment; that no absorption takes place if petrolatum is used as the vehicle; and that less absorption results when lard is employed in the place of hydrous wool fat.

The relatively slight differences manifested by the ointments of methyl salicylate made with petrolatum, lard and hydrous wool fat indicate that these vehicles possess no real therapeutic differential effect on absorption, an observation which was confirmed by Brown and Scott (19), in the case of methyl salicylate, after the completion of the preliminary studies of this investigation.

Iodine is absorbed from the skin much more slowly and less effectively when applied in the form of ointments than from alcoholic solutions. Lard, however, demonstrated a slight, though unimportant, advantage compared with petrolatum and wool fat ointments. Some slight differences in solvent and in softening powers may explain in part this small advantage. In the case of the tincture, no positive tests were observed in the urines until three applications were made. This tardiness is probably dependent upon (*a*) the retarding effect of the proteins precipitated by the elementary iodine, (*b*) the combination of a part of the iodine with the fatty

vehicles, (*c*) the formation of loosely combined compounds of iodine, (*d*) possible retention and (*e*) in some cases, even individual impaired kidney permeability to iodides. Later, when repeated applications of the tincture resulted in injury to the skin, the penetration and absorption of the iodine, though partly bound, are facilitated. Iodine may be absorbed better from alcoholic solutions than from fatty vehicles because alcohol is a better solvent and is itself volatile, and greater skin injury results.

Aqueous solutions of iodine, ointments of potassium iodide and ointments of quinine hydrochloride are not absorbed in detectable quantities from the skin, if their absence in the urine is accepted as a criterion. The hydrophilic nature of the potassium iodide and of the quinine hydrochloride may explain in part these results, but this would not hold for the iodine of the aqueous solution of iodine, although a possible retarding rôle of the relatively large proportion of potassium iodide in the aqueous iodine solution and in the ointments of iodine should not be completely disregarded.

The properties and powers of the drug itself, rather than of the ointment vehicle used, are the major determining factors in absorption from the skin. A drug which is absorbable in ointment form from the skin will be absorbed with little regard to the vehicle employed. Volatile, fat-soluble agents are more readily absorbed from skin than are the more water-soluble substances, and incorporations of the latter with fatty ointment vehicles do not necessarily insure their absorption from that site.

Throughout these studies, it was observed that the youngest subjects, the females, those with soft, finer skin textures—especially the blondes, and the fat individuals (who were prone to perspire freely, and thus enhanced skin softening and maceration) recorded more prompt and intense positive reactions. Although the absorption advantage of these classes was calculable in terms of per cent—the largest value in any one series having been 5 per cent in favor of these types, the data are not sufficiently convincing to warrant definite conclusions. Such susceptibilities may be kept in mind, however, when resorting to skin medication in the cases of children, women and blondes. These class or group susceptibilities may be due to differences in the anatomical structure of the epidermal layers of the skin or of the sebaceous glands and sweat glands, to special characteristics of the sebaceous matter, and possibly to qualitative and quantitative differences in the formation of protein, fatty and cholesterol compounds with the drug agents.

## REFERENCES.

(1) Bliss, A. R., Jr., *J. Tenn. Acad. Sci.*, 9, 21 (1934).

(2) Bliss, A. R., Jr., *Ibid.*, 10, 181 (1935).

(3) Bliss, A. R., Jr., *Drug & Cos. Ind.*, 35, 3 (1934).

(4) LaWall, C. H., "Four Thousand Years of Pharmacy," J. B. Lippincott & Co., Phila., Pa., pages 8, 18, 170, 7 and 41 (1927).

(5) Davis, H., "History of Ointments and Ointment Bases," *Brit. Med. J.*, 2, 1012 (1913).

(6) Wild, R. B., *Ibid.*, 2, 161 (1911).

(7) Rusby, H. H., Bliss, A. R., Jr., Ballard, C. W., "Properties and Uses of Drugs," P. Blakiston's Son & Co., Phila., Pa., 17 (1930).

(8) Sollmann, T., "Manual of Pharmacology," 3rd rev., W. B. Saunders & Co., Phila, Pa., 130 (1928).

(9) Roberts, L. H., *Brit. J. Derm. Syph.*, 40, 325 (1928).
(10) Benzinger, Th., and Wyrsch, R., *Klin. Wochschr.*, 12, 1734 (1933).
(11) Paffrath, H., *Arch. exptl. Path. Pharmakol.*, 174, 143 (1933).
(12) McCord, C. P., *Am. J. Pub. Health*, 24, 677 (1934).
(13) U. S. Pharmacopœia VII, 469 (1890).
(14) U. S. Pharmacopœia X, 217 (1920).
(15) Sollmann, T., "Laboratory Guide in Pharmacology," W. B. Saunders & Co., 82 (1917); *Ibid.*, 64 and 94.
(16) Ramsden, W., and Lipkin, I. J., *Ann. Trop. Med. Parasitol.*, 11, 443 (1918).
(17) Roberts, L. H., *Brit. J. Derm. Syph.*, 40, 325 (1928).
(18) Association of Official Agricultural Chemists, "Methods of Analysis," 2nd rev., A. O. A. C., Wash., D. C., 102 (1925).
(19) Brown, E. W., and Scott, W. O., *J. Pharmacol.*, 50, 32 (1934); *Ibid.*, 373.

## THE VEHICLE VALUE OF SYRUP OF CHERRY, N. F. VI.*

BY BERNARD FANTUS AND H. A. DYNIEWICZ.

It may not be sufficiently appreciated by pharmacists as well as physicians that the National Formulary has now available two fruit syrups: namely, the Syrup of Raspberry and the Syrup of Cherry. Both are made by a very simple process from the fruit juice preserved by 1 : 1000 benzoic acid, hence are endowed with good keeping qualities. Both of these syrups have the delicious flavor of the fruit they represent and there is every reason to believe that they will become quite popular with the physicians, especially if the pharmacists would take it upon themselves to call the doctors' attention to these truly elegant pharmaceuticals.

The Syrup of Cherry might be looked upon as a direct competitor of the Syrup of Wild Cherry, which latter has a very extensive use as shown by the following data from the Gathercoal[1] Prescription Survey:

Usage per 10,000 Prescriptions.

| 1885 | 1895 | 1907 | 1926 | 1932 |
|---|---|---|---|---|
| 175 | 135.5 | 120 | 158.8 | 121.8 |

It is generally admitted that the Syrup of Wild Cherry is nothing more or less than a flavoring vehicle; and, as long as we had nothing better, it had to be good enough; but it seems that anyone who had the choice of taking a dose of medicine flavored with either Syrup of Cherry or Syrup of Wild Cherry would unhesitatingly vote in favor of the Cherry Syrup. The Wild Cherry Syrup being made from the bark of *Prunus Virginiana* has really nothing to do with cherry excepting for the cherry-like bitter almond flavor. It has a rather acrid astringent taste because of the tanic acid it contains and it is devoid of acidulousness of a fruit syrup such as the Syrup of Cherry. If pharmacists were to flavor their fountain drinks such as "cherry phosphate" or "cherry sundae" with Syrup of Wild Cherry (bark) they would have very little sale for this kind of preparation. Then

* From the Laboratory of Pharmacology and Therapeutics of the University of Illinois, College of Medicine, and assisted by a grant from the American Pharmaceutical Association.

[1] Gathercoal, E. N., "The Prescription Ingredient Survey," American Pharmaceutical Association, Washington, D. C., 1933.

why, in the name of common sense, should doctors persist in using Syrup of Wild Cherry when a much more elegant vehicle syrup of similar flavor is available in the Syrup of Cherry?

### IRON MEDICATION VEHICLE.

Besides the superior flavor and palatability of the Syrup of Cherry it has fewer incompatabilities than has the Syrup of Wild Cherry owing chiefly to the fact that we do not have to contend with the incompatabilities of tannic acid. Thus, Iron and Ammonium Citrate may be prescribed in Syrup of Cherry, as, for instance, in the form of the following prescription which would result in ink if the Syrup of Wild Cherry were employed:

℞

| | |
|---|---|
| Iron and Ammonium Citrate | 10 Gm. |
| Water | 5 cc. |
| Syrup of Cherry, to make | 120 cc. |

Mix and label: Teaspoonful to tablespoonful in water three times a day after meals. (Hematinic tonic.)

The now recommended large dose of this iron salt is contained in a tablespoonful of the preparation. The disguise of the taste of the iron and ammonium citrate is so good that twice the quantiy of the iron salt could be given per teaspoonful, which would then carry quite a good sized dose.

Should anyone believe that the astringency of the Syrup of Wild Cherry is of therapeutic value, it would be more rational to prescribe an actual astringent in adequate dosage rather than to rely upon the feeble degree of astringency of the Syrup of Wild Cherry for any remedial effect. Old-fashioned doctors had great faith in the Tincture of Ferric Chloride in the treatment of scarlet fever and diphtheria and other conditions associated with sore throat. It is not improbable that the chief virtue of this dose resided in the astringency exerted upon the inflamed throat as the dose was being swallowed. While Syrup of Wild Cherry is not likely to exert any appreciable effect in this direction, the following dose might:

℞

| | |
|---|---|
| Tincture Ferric Chloride | 5 cc. |
| Syrup of Cherry, to make | 60 cc. |

Mix and label: Teaspoonful in one-half glassful of water every two hours. (Astringent iron tonic.)

The special value of such treatment in cases with sore throat is probably to be found among those who cannot gargle. Incidentally, this prescription yields the best disguise for Tincture of Ferric Chloride we have yet encountered.

### ACID MEDICATION VEHICLE.

Cherry Syrup is the vehicle par excellence for sour tasting medicaments: the result being the "cherry phosphate" taste and flavor. It has a $p_H$-ion concentration of 3.4; and, what makes it especially valuable as a vehicle for acids, is its buffer value. Thus, for instance, it is difficult to imagine, unless it be the Syrup of Raspberry, a better disguise for Hydrochloric Acid than the Syrup of Cherry as yielded by the following prescription:

℞

| | |
|---|---|
| Diluted Hydrochloric Acid | 10 cc. |
| Syrup of Cherry, to make | 120 cc. |

Mix and label: Teaspoonful in wineglass of water three times daily after meals. (Digestant in hypochlorhydria.)

Iodide is notoriously hard to disguise and yet no child is likely to refuse a dose of the "cherry phosphate drink" resulting from the following prescription:

℞

| | |
|---|---|
| Syrup of Hydriodic Acid | 20 cc. |
| Syrup of Cherry, to make | 120 cc. |

Mix and label: Teaspoonful three times a day after meals. (Alterative.)

The Syrup of Cherry would also carry an adult dose of Diluted Hydriodic Acid in form of a pleasant disguise.

### ACRID MEDICATION.

A true test for the efficiency of a disguising vehicle in so nasty a thing as urea, which has an insipid and yet acrid taste; perhaps the best disguise for it is obtained by the use of Syrup of Cherry:

℞

| | |
|---|---|
| Urea | 15 Gm. |
| Syrup of Cherry, to make | 60 cc. |

Mix and label: Teaspoonful in water every three hours. (Diuretic.)

Possibly the least objectionably tasting hypnotic is Ethyl Carbamate (Urethane) which, while not reliable for adults, is sufficiently strong for children; and the following prescription yields as palatable a hypnotic dose for a child as we are acquainted with:

℞

| | |
|---|---|
| Ethyl Carbamate (Urethane) | 5 Gm. |
| Water | 7 cc. |
| Syrup of Cherry, to make | 60 cc. |

Mix and label: Teaspoonful in water at bedtime. (Hypnotic for a child.)

### BITTER AND SALTY MEDICATION.

Syrup of Cherry is hardly to be recommended as a vehicle for salines such as ammonium chloride or potassium bromide, which are more pleasantly disguised by Syrup of Glycyrrhiza: or for the bitter alkaloids for which the Aromatic Syrup of Eriodictyon might be considered a specific disguising vehicle. Nevertheless, for alkaloids of moderately bitter taste, such as atropine or ephedrine, the Syrup of Cherry holds its own with any one of its competitors. This, no doubt, is why the Syrup of Ephedrine Sulfate now official in the national Formulary is made with Syrup of Cherry as a vehicle. Its composition is as follows:

℞

| | |
|---|---|
| Ephedrine Sulfate | 4 Gm. |
| Distilled Water | 20 cc. |
| Alcohol | 20 cc. |
| Syrup of Cherry, to make | 1000 cc. |

Dose: 4 cc. or one teaspoonful.

Each teaspoonful contains 0.02 Gm. (1/3 gr.) of Ephedrine Sulfate.

### INCOMPATIBILITIES OF SYRUP OF CHERRY.

Like everything else in nature, Syrup of Cherry has its weak points, chief among which is its incompatability with alkalies. These decolorize it, more or less completely, and in proportion to the degree of alkalinity. One might indeed think of the coloring matter, which is a cyanidin derivative, as an indicator for alkalinity.

So delicate an indicator of alkalinity is Syrup of Cherry that so slightly alkaline a substance as methenamine ($p_H$ 7.6 in water) and aminopyrine ($p_H$ 7.6 in water) almost decolorize it.

The same condition prevails in connection with other salts of feeble acids such as potassium citrate ($p_H$ 7.7), sodium phosphate ($p_H$ 8.4), sodium borate ($p_H$ 8.8), and potassium thiosulphate ($p_H$ 8.9), all of which decolorize the syrup. In fact, a solution of any salt that is even slightly alkaline to litmus will decolorize Syrup of Cherry.

Sodium bicarbonate ($p_H$ 8.2), for instance, strikes a dirty gray color and precipitates after standing with Syrup of Cherry and effervesces for many hours. Sodium carbonate ($p_H$ 11.6) strikes a dirty brown color and also effervesces for quite a time and after standing a clear brown fluid remains.

The suggestion has been made that this incompatability might be avoided by neutralizing the acidity of the Cherry Syrup by means of alkali, such as sodium hydroxide. This, however, not only destroys the beautiful color of the syrup making it a dirty brown, but also renders its taste flat and "lifeless:" the delicious tartness of the fruit having been lost.

Owing to the fact that Syrup of Cherry contains benzoic acid it has the incompatibilities of benzoates, which are salts of silver, mercury, lead and quinine. It might be noted in this connection that Syrup of Raspberry has the same incompatibilities.

### ADULTERATED CHERRY SYRUP.

When we started our study of cherry syrup, we were informed by fruit syrup manufacturers that it was impossible to produce an acceptable cherry syrup made from the fruit without artificial coloring and flavoring. For this reason we experimented with both of these additions, as well as with pure fruit juice and found that, provided the crushed stones were added to the juice, there was absolutely no reason for artificial flavoring. We find, indeed, that the addition of oil of bitter almond, to fortify the cherry flavor, produces the peculiar result that the bitter almond flavor seems to become concentrated in the air space above the syrup in such a way that unless the bottle is previously shaken, one gets an unpleasantly strong whiff of bitter almond odor when one removes the stopper. This does not seem to occur with the pure fruit preparation. There is, of course, a variation in the natural color of cherries which reflects itself in variations of the color of the syrup prepared from them. This variability is of the same nature as that of the color of Syrup of Orange; and could only be remedied by the adoption of color standards.

### INCOMPATIBILITIES OF SYRUP OF WILD CHERRY.

From what has been said before, it might seem that Syrup of Cherry has quite a number of incompatibilities. It should be remembered, however, that Syrup of

Wild Cherry has more of them. Its $p_H$-ion concentration being 4.1, it is incompatible with carbonates and bicarbonates which produce with it a very slow but definite effervescence. It is also incompatible with acids, such as diluted hydrochloric acid, which on standing produces a precipitate with this Syrup. Needless, to say, it has, in addition to this, all the incompatibilities of tannic acid, which are as is well known, quite numerous.

### CONCLUSIONS.

1. Syrup of Cherry is a delicious flavoring vehicle which should largely replace the Syrup of Wild Cherry in prescribing, for the following reasons:

(*a*) Syrup of Cherry is more palatable.

(*b*) It has fewer incompatibilities: Iron preparations and acid medicaments being particularly well carried by it.

(*c*) Acrid medication is also sometimes particularly well disguised by means of Syrup of Cherry.

2. Bitter alkaloidal preparations are better disguised by Aromatic Syrup of Eriodictyon: salty medicines, by Syrup of Glycyrrhiza.

3. Alkalinity, even that of a slight degree, is the most important incompatibility.

---

## THE EARLY DAYS OF PHARMACY IN THE WEST.

BY JOHN T. MOORE.*,[1]

Dr. Moore traces the gradual growth of merchandising in the drug stores of the Middle West in an interesting manner and shows that what is familiarly known as the "drug business" is marked as something different from merchandising in general, and that it is founded on the "Spirit of Service," a fundamental trait in the pharmacist.—L. D. HAVENHILL.

It would be truly difficult to write of the early days of Pharmacy in the West; the less inspired form of narration would take the guise of personal experiences—dreamily egotistic with such marring intrusions unrealized or properly recognized and applied as modifying influences. With the fullest intention of being an assistant historian of a vanished cycle, the easy-going narrator can easily fall by the wayside of yielding to the urge of the untold funny story, the ludicrous detracting from the sober consideration of points more interesting.

The mere writing down of a series of personal trivialities might entertain, being in themselves history in the sense of having occurred. But to be informative it is necessary to deal with events in the mass, banishing the individual at the very start. It may make the performance very drab at the beginning, but can the truth be arrived at without such imposed restrictions?

---

* Section on Historical Pharmacy, Madison meeting, A. PH. A., 1933. This interesting article fits in with the section of the country in which the ASSOCIATION is holding its Meeting.

[1] *John T. Moore*, who died May 11, 1932, was a pharmacist in Lawrence, Kansas, for nearly 62 years; a member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1888 and a charter member of the Kansas Pharmaceutical Association. A short obituary appears in the JOURNAL A. PH. A., 21, 625 (1932). The manuscripts from which this article was prepared were given to **L. D. Havenhill** by Mrs. Moore, and the former presented the paper herewith at the Madison meeting.

To construe one's own activities as a type and apply them as being mere replicas of what occurred at the same time to a small number—scarcely a score or two of similar workers in a new field may be one way of tempering the mass—to snub personal intrusion—perhaps that is the most to be hoped for.

Why was what we know familiarly as the "drug business"—no matter where existing—marked as something different from merchandising in general? It was mildly an evolution of a kind. It seemed unconsciously to extricate itself from common commercial crudities and align itself into a smoother progress. It was an imperceptible growth—not a marked change.

Merchandising in its simplest form was everybody's field of operation for mere monetary gain or the necessity for making a livelihood by making a venture to get what came to the worker for his labors; always an existence and the hope of something over. The gamut of possibilities met comers of all ranks and mentalities, including trade workers, domestic craftsmen, day laborers, potential professional men and everybody.

Undoubtedly there was the small percentage that developed the drug business as others did the more or less intellectual vocations. From whence came the predilection? The rather recluse-like nature of the drug dealer as opposed to the more or less vivacious opportunity-seeking lawyers, surveyors or land sellers? Pharmacy grew around a significant few and thereby hangs a tale, maybe; a tale or guessings of origins.

The starting point for the dealing in drugs—the twilight of Western drug handling as an independent occupation—may perhaps be set down as occurring in the middle 50's. Any present-day narrator will necessarily allude to the period, because corporally he was not himself in it at the start—he was not mature enough to have been a participant, although coming into the field of work soon enough after to learn from those of earlier activities what their experiences had been, through the usual "I recollect that" conversations of the principal with his clerks; this makes the touch complete.

Many observers at various times have rather wonderingly given out the impression that there was at least a veneer of literary culture clinging to the old-time druggist; not pronounced, but with potential significance; even as the odor of sanctity was said to accompany the goings and comings of the poorer brethren of the church in medieval times. The mere taking up of the calling of course conferred no virtue or ability; why should it invite the accession to its ranks of any already literary person?

A cogitating inquiry—a superficial survey and scarcely that, educed the idea that gained strength as it was dallied with—that those assuming drug duties had played some sort of executive rôles in the states they came from; totally removed from mercantile pursuits but exercising their reflective powers to a greater extent than the rank and file of citizenship indulged in. What would be purposeless imagination in the latter would be purposeful activity in the former. This reflective trait is not of the things that weaken, though it might slumber if not in constant use. An almost proved inference followed up showed that the majority of natural drug men came from the pedagogical classes or from the crusading missionary-inclined people—the emissaries of religious uplift associations, commis-

sioned and sent to serve the later day "Winners of the West," as Roosevelt ably named the active pioneer.

The young man who taught school with perhaps the intention of extending his own intellectual advancement, was, like most of the populace, imbued with the idea of the great future of the Western country—with affluence a possibility. He, of all others, would select some staid occupation, like pharmacy, as being akin to medicine, affording his mentality freer exercise. He would welcome an echo of his old work of the school house in the always recurring botanical Latin of drug titles which lessened the strangeness of the new vocation. Perhaps a trifle like that made the beam of the deciding balance waver and tremblingly descend to a decision. The other order of worker sent West for the good he might be able to do in sympathetically building the waste into dwelling places, met the asperities of pioneering and the commonplaces of existence at once. While seeming proselyting would be unwelcome, real help to needy new settlers would be grasped gladly. The fervor of a possible missionary was replaced by a commonsense healthy activity in helpful affairs and met with appreciated welcome.

The eastern border of Kansas was one of the river "jumping off places"—a margin of the real West. The missionistic urge that impelled the normally moral, fair-minded being to become a helper in a wilderness led also to casual unsectarian discussions, tinged with a faint suggestion of a religious interest; a keeping alive of the decencies the average pioneers brought with them. There were some more active ones of this caste who were possibly subsidized to keep up some church affiliation interests.

It often followed that dependent people became sick people. The first to give help was everybody's friend—the man who went around with a Testament and a bottle of quinine—a preacher. He played the nurse, dictated the concocting and dosing of simple shack-brewed drugs and furnished the highly indispensable doles of ague medicine out of mere compassion. In more serious sicknesses he played nurse—he nearly always had to. In rough and ready surgery he had to improvise and take a doctor's part. By degrees he almost imperceptibly became the doctor in fact of the place—not college taught, but capable and a God-send. His abiding place, shack, cabin or whatever it was, became a dispensary—gradually it grew into a drug store. The rover became more and more a fixture who made some local peregrinations on occasion, but was nevertheless the original druggist of the locality. It would astonish many of us to-day to know how many successful physicians and surgeons of the West never attended a medical college at any time. A few books, observation and common sense supplied what was supposed to be inculcated in training schools. Indeed medical schools were few and at that period were largely associations of practical workers in the healing arts, who welcomed good-sized lecture fees as legitimate additions to their practice income, which in truth they were.

What is here said about the paucity of schools of medicine applied, too, to pharmacy in a much greater degree. Philadelphia, New York, Boston had colleges of Pharmacy and a few of their graduates were lost, or at least concealed, in the West. The aristocrats of the profession were a very few individuals who persisted at the river towns unknown as to attainments. In the late 60's a few of the college-taught druggists essayed to start a school of pharmaceutical training in

much the same way as the older lecturers on medicine had succeeded in doing. The pharmacy effort went through some preliminaries but never got down to business. The first Kansas drug dealers in the near-the-border interior were intellectually competent to establish practical pharmacies—many had had the chemistry, botany and languages that permeate drug studies; their application was absurdly simple then, or seems so now. A few had nibbled at the apprentice drug jobs of distant states and soon the Kansas druggist in the larger communities was a real person; to a certain extent a person conceded to be superior to the butcher and candlestick maker. And it should not be forgotten that the assumption of pharmacy was a sacrifice of a kind. Anyone in the calling could have made much money—nay, may even have become rich with more prosaic trading in a few sunlight hours, while the druggist worked "all the time." What time he did not devote to his drugs was spent in the work imposed on him in the way of civic duties that called for the exercise of brain tissue. Be it said that he never evaded what he thought was right to be called upon to perform for the community's good.

It must be understood that in these early days and in times very much later, an exclusive drug business was impracticable. Some reasonably non-conflicting merchandise, collateral things, had to be sold to assist in making three meals a day and shelter a surety. Stock of varied kinds that played a double part was available; for instance, linseed oil was decidedly a drug—it made green soap, carron oil and liniments; linseed oil, too, was a painter's necessity; the painter's litharge and red lead made some of the ointments. A mixed stock accumulated gradually and in this way the drug store became the paint store—there was no other source of paint of public accessibility. Be it said at the start that the drug store stole no lines of goods from others. The side-lines it accrued came as a matter of growth and necessity.

Perhaps a lesson in nomenclature arises at this point. In later years there was a coming in of inexpert, or at least less versed drug store men, who were prone to use the terms official and officinal as being interchangeable—a coating of obstinacy pervaded their warm assertions to that effect. Their views were authoritatively scotched later. Adapting a Latin dignity of title might reasonably restrict *materies officiales* to furnishing the articles required for pharmacopœial and hospital formulas use while *materies officinales* could take in the side issues of stock and things less related in a more correctly descriptive way. Why may not the differentiating words applying to official preparations apply to the classification of the drug stocks furnishing the materials that go into the making of them?

The beginning of pharmacy or its equivalent was in all likelihood the same with every race or people or country. The practice of pharmacy was a compulsory duty called into being by the needs of sick people. Outside of provision places, at the van of all Western gains of territory was the practical pharmacy place of that era. It was the pioneer mercantile business. "'Twas mightiest in the mightiest." It carried culture with it unbeknowingly. It was culture by contact in Western America not necessarily of college origin. The pure school of drugs had hardly an existence. A hiring constituted an apprenticeship. Few that started in the rut ever got out of it. It became a life's work with most of those who took hold.

The early days of pharmacy in the Middle West and beyond cannot be por-

trayed by a single writer. The experiences of many enter into their showing. As a whole the finished account should lack the taint of a task—it should have an aroma of free inspiration.

There was a time, within the recollection of people still living, when between the Missouri River and the Pacific Ocean there was no place where one could find medicines. Pharmacy was probably known and practiced at a fringe of places on the coast line of Western America; but in between, nothing. The redskin may have had emergency trifles tucked away in his belt or trappings, but he found his remedies on the spot when he wanted them. There were remedies everywhere; a fine field of botanic *materia medica* was ready for the aborigine or observing seeker.

We will suppose that the place of drug handling—the view centre of our observations has opened up and is past the embryonic stage. Four walls of logs, maybe, or adobe, earth-fashioned with a protecting roof. Light entered through small panes of glass, then 8 x 10 was a luxury while 7 x 9 was the size in every-day use—some with glass blower's "crowns" were not rejected; waves and undulations didn't count, things inside did. The doctor's saddle bags carried practical things that made them weighty. The drug store had to replenish them and the doctor welcomed the druggist and his help in the way of commissariat and judgment.

Beside its neighborhood patronage it called trade from widely upbuilding circles, farms and ranches. Perhaps only trifles were wanted but they had been planned by the squatter or settler long before the opportunity to get them came. Each trifle gave a profit and sufficient to pass in Shakespearean phrase as "a ripe and good one." The ample profit was expected and tolerated while the desired chance to acquire it was appreciated.

These stores were not places of business where customers were awaited with the modern avidity akin to spider and web. There was always something doing—the druggist was always busy getting ready for business. His supplies were always in the crude; they had to be made up; ground, enhanced in condition and variously compounded. The drug business could always be, and was, run as an all-day job, while the work, because of interest evoked, seemed less burdensome than the energy expended in other callings. It varied; it was never twice alike. Each new task was really a work of research to the operator. It became an enjoyable widening of the remedial horizon. The work was readily appreciable as being in the category of the "beginnings of pharmacy." Nearly a quarter of a century later a book was issued by R. Rother with that title for the instruction of apprentice minds; it did not find the apprentices, of course, but it went into the tasks and conducting operations of real drug stores very thoroughly and intelligently. Factory pharmacy was barely started then—that form of usurpation of many galenical operations that should, for the good of pharmacy, have been left to the pharmacists.

The rear of a drug store, usually partitioned off, was a drug kitchen of a sort; by degrees it grew into a laboratory. The race origin of the proprietor often determined the trend of usefulness of its operations; the witch's cauldron glowed again and uncertainties were a normal thing—its smoke making perpetual rings of question marks. The tendency to German influence was a noticeable thing.

As foreign elements of population filtered into the mass of active pioneers and no movement of any kind long remained unmixedly purely American, the mingling resulted in strength and variety. The effect of the racial amalgamations was to

cause addition-changes in the items entering into stock. Some of the simples of foreign pharmacopœias became influences in the popular demands for medicaments.

The getting of stock to manufacture and sell was a different problem then and a difficult one. Stores were usually a long way from the sources of supplies. To express conditions in a bald way everything had to come from places east of the Mississippi. Complete working material could hardly come from any one supplying city. For instance, New York, Philadelphia, Baltimore, each contributed to an assembling of necessary things. Each was a first-hand market for some things in which it excelled. Some of the interior mid-continent towns did slowly acquire distributing importance for original warehouse accumulations—resting places at the ends of transportation trails—where the railroad ended or the canal boat had to unload, or the river boat lacked depth of water to cope with bars. These places became potential replenishing points from which commodities were hauled *via* covered wagon trails to the final resting points.

When drugs were bought it was directly advantageous to buy a lasting quantity of non-perishable things if transportation conditions were favorable. Dry goods merchants and clothiers and dealers in volume making shipments of changeable stock dependent on fashion's whims made their principal purchases about twice a year. Even so the druggist, although for very different reasons, timed a spring or autumn purchasing period. Those with a patronage that caused the use of lots of goods took advantage of the lower freight rates that the general merchandise shippers were often able to get. There was rivalry in railroad freight rates in those days. A freight rate fight was a merchant's opportunity, when a special price on mixed merchandise in carload lots was the temptation. The pharmaceutical buyer was interested, too, especially when he could count on supplying lesser drug confreres on the edges of his territory with some of his excess purchases as a relief later on. It may be amusing to the modern druggist to know that a cask of hundreds of pounds of English rock chalk in chunks of 8 or 10 pounds would be an item in an early drug store. "Rock Chalk, Jayhawk" was an unknown slogan, then, although it is a fact that the first use of that slogan was voiced by a young assistant professor who had entered college life *via* drug store surroundings. The chalk went into stock for conversion into putty; most every dealer in window glass had to make his own putty. The chalk was cheap at seaports for it came from overseas as ballast in ships, but it was necessary to buy it when there was a war in freight rates in order to get it as an item in a manufacturing stock. Sulphur was purchased by the several barrels; sal soda, fish oils, Spanish olive oil in barrels of manufacturing quality, pure but hardly edible; bay rum, the real thing, from St. Thomas in small barrels; Glauber's Salt, soda ash, epsom salt, camphor and borax—anything to make up a minimum weight mixed carload. Merchandise that was easiest on the bank account was schemed for as bulk makers for carloads. Here it may be observed that California's borax and olive oil had never been dreamed of at that time. Also the handler of daintily packaged Asafetida (or as it was spelled then—assafœtida) is advised that it counted largely in carload purchases for stocks of early days; a whole case of perhaps two hundred pounds was the chunk of the delectable drug which the handler cut up with a hatchet and served out in tin cans, as wanted. The arrival of such aggregations of stock was antici-

pated keenly by the younger rustling workers of the drug emporium, who were sometimes at a loss to know where they would house it when it came.

The back-of-the-shop laboratory soon amounted to something. Operations were larger than many would suppose—especially in the early started stores that were compelled at first by courtesy and afterward because of satisfactory profits to divide manufactured stock with others.

The variety of the demands for simple drugs and prepared hand-out formulas in bulk, progressively increased in early-day pharmacy as the overflow of the immigration melting pot added trade volume. Every foreign country has its folk-traditional domestic remedies for everyday ailments. Some came through the scions of the old settled foreign element of the Eastern states and many from more recent immigration. France, Germany, Italy, Russia, contributed many types of excellent-to-use formulas which gradually met the approval of all communities. In this way the items from foreign pharmacopœias and recipe books not only went to make a markedly accented Western pharmacy list of preparations, but compelled the acquiring of a pharmaceutical compounding facility, which in itself invested the calling with a certain expert dignity which would hardly have been evoked by the satisfaction of purely American needs and demands. In other ways the American druggist was being educated into dosage and the nursing art without being aware of it, while old time remedies from European sources were being added to the newer botanic drugs and preparations known to the American pioneer. Occasionally a person with drug manipulative experiences in the East or at some time or other in Europe, filtered in and took a hand in the game of Western Pharmacy. Full soon a foreign-born proprietor was helping in molding a calling of advantage to medicine and the people.

Crude drugs were received in bulk paper packages—it was before the day of ready-make paper bags. The usual packaging consisted of the shaping and binding of loose material and an outside wrapper. The making of a package by a supplying wholesaler in those days was a fine art. The completed unit from an Eastern supplier was often a bit of handsome mass shaping with the sides level and the ends and corners square. The irregularities of a three or four-pound package of lump benzoin were made to subside into a more or less quadrilateral mass by jolting and suasion and patting and squeezing in a rather large sheet of browny white paper; in fact, a flat, wooden paddle assisted in the shaping process and a ligature of stout hemp twine held the recalcitrant irregularities in leash. A rough faint pencil memorandum mark was made on the paper and a heavier lighter colored wrapper was daintily and tightly applied by firm folding. The best parcel marker of the concern then added the finishing touch of bold titling—often in an artistic manner.

There were many grades of benzoin; marbled benzoin was most esteemed. The choicest, mostly used as a perfume element, was the Siam which came in "tears" —tears of regret, maybe, for it was a scarce article indeed, with rich vanilla-like tang.

A ten-pound package of senna leaves, Tinnevelly or Alexandria, was more easily packed, but reminded one of the filling of a cushion tick with goose feathers. It took more string and a tricky application of pressure to shape that bundle. If anyone wishes to experience the necessary skill involved in the

art of making a presentable retail package in the days when paper sacks were not, let him try to wrap up half a pound of whole flax seed for "cough tea" in a flat sheet of paper making a tight rectangular package of it.

As a note by the way, it may be set down that the little labor-saving paper sack tended to a benumbing of the skill in pharmaceutical neat package dispensing. A two- or three-ounce package of flowers of sulphur or four ounces of bicarbonate of soda used to be rapidly furnished at the common sale counter in neat tapering flat-sided oblong packages with wedge-shaped ends, which showed care, suggested safety and invited confidence. Of course, as now-a-days, many of the often-called-for things were kept packaged ahead. Besides saving time it afforded a lazy druggist a chance to see that the spare minutes devoted to parcel making would also result in producing seductive packages in appearance. A decade or so after the paper sack had come into use in nearly all businesses, in sizes from four ounces to a score of pounds or so, its inroads in supplanting drug daintiness were marked. The newer drug clerk would throw a few sticks of kitchen cinnamon higgledy-piggledy into a much too large ready-made sack, scribble a pencilled something on the delivered item, and let it go at that, with much too many fluttering twine ends to emphasize its awkwardness. In the years before, the clerk would assemble the scrolls of bark in fairly equal lengths on a sheet of white drug paper and shape them into an acceptable package without protruding pieces—he would then have applied a sticking label, ink-written and legible. The earlier druggist during the succeeding years when he saw the "tie up and throw out" packages that went to the public over the counter, simply winced, so uninviting were they and unrecognizable as having emanated from the hands of a skilled person of any kind. It was a loss to Pharmacy to cease to make the anticipated neat drug bundle. It helped to pave the way for inviting cartons of the chain pirates who apparently can "get away" with anything if the package is nice.

With every drug store owner necessarily a manufacturer, the quantity of a preparation made up in the back room was dictated by experience learned of his trade necessities. "Batches" of things varied with shops and localities. Somewhere in each establishment some messy job in course of making would be placed in a retired corner and worked to a finish by labor at odd moments which challenged no attention but "got there all the same." Mercurial ointment, for instance, was one of these. Much of this ointment was used in early-day trade. The veterinarians perhaps kept the earthen container a vessel to be watched for, seemingly every salve recipe of theirs contained some of it. It was no uncommon way for the thing to be made in a large, white, enameled iron evaporating dish, with a large Wedgwood pestle as an incorporator. It was understood to be everybody's job to give the fatty base and the mercury a forceful twist when he passed the dish, replacing its extemporized cover at each attack. A small quantity of an old lot of mercurial ointment with a suggestion of rancidity was always saved as a sort of catalyzer to mechanically hasten extinction of the live quicksilver. It was a rarity to find the laboratory with any large utensil not in use. By large it may be said that the evaporating dish here called to mind as having been used, was of a capacity of three gallons. A mixing motion attack in a case like this was often familiarly alluded to as a "swipe." All the plaster mixtures were necessarily home made. The only purchasable plaster mass was, if memory serves, that of cantharides which used

sometimes to accompany chemical shipments from Eastern manufacturers. Plaster spreading was a frequent prescription activity.

If the use of the word "laboratory" in connection with the early-day drug store seems presuming and stealthily injected to invest the place with unearned dignity, let it be taken with its least dignified significance—a *labor*-atory which in truth it was in those days of clumsy chemical knowledge, and when all work was research, perforce, to an operator who had never made the finished chemical preparation before.

Customers' wants and demands were entirely different from what the modern pharmacist would vision to be possible, so the home manufacturing and multivarious all-day compoundings were enforced activities. The simplest needs of a customer were seldom "hand outs;" what he demanded called for some work, involving measuring, weighing, mortar and pestle mixing, milling, sieving to all degrees of coarseness and fineness—the sieve of brass, iron or bolting cloth, the latter perhaps begged of the local flour miller—the using of varied applications and intensities of heat; all these were normal functions in the practice of pharmacy. Almost entirely the proprietary ready-made remedy was an unknown thing. A few quack nostrums of archaic origin, like Haarlem oil, were to be found in the world's commerce and few knew from what place or country or firm or family a certain supply emanated. Perhaps a dozen of so-called patent medicines as nostrums for prevailing ailments covered the category of known prepared medicaments and these were for constipations or choleras, agues, parasitic disorders—really for desperation camp emergencies in general. In the Eastern states there were probably a greater variety of such offerings, but as retail units of many things were Gargantuan and difficult of commercial transportation, most of these were made for local sale in well-populated centers and came not West. The big sized packages of bitters and blood panaceas were possible because of the almost unbelievable cheapness of alcohol which made a quart size of blood tipple current and possible. In those days when a gallon of whiskey could be bought for "a quarter," the bottles of stuff purporting to be tonics had to be ostentatiously liberal in size to tempt the dollars of the imaginary sick people.

It may be held forth that even in the new West a form of proprietary medicine was nevertheless regionally popular in the sense that many of the stores in the larger communities put up ready-to-dispense sizes of medicines for prevailing sicknesses; when every third or fourth customer was himself a suffering malarial victim and his family in general were "down with the chills," speeding up the delivery of remedial agents was appreciated service. The favored compounds became more or less famed and the smaller stores in near-by places bought them for resale. Many, indeed, of these early-day conveniences became, without planned intention, proprietaries—sufficiently so that in the years succeeding they gained reputation sufficient to branch off into a separate business undertaking of their own; offering instances of once active necessities becoming perpetuated conveniences of proved value. Many well-known ready-made preparations of to-day were born in that way.

It was rare for a new settler to come to the West without his recipe (or as he called it "receipt") book of emergency things. Some pharmaceutically atrocious mixtures met with daily dispensings, and played the part of equivalent prescriptions

which would result from the rounds of doctor's daily visits, if there had been enough medicos to go around. These recipe books offered a solution for every trouble that perplexed the farmer or squatter or dweller from town centers. It was hard to find a drug store without a "file" of these volumes of cyclopædic knowledge. The pages devoted to dyeing were hard worked and bore visible evidence of it. There were no dyes of manufactured organic chemical origin—no package dyes. Crude woods, barks, roots, fungi, insects and chemicals, such as copperas, chromates and ferrocyanides, furnished the hues and colors. The drug man who could impart the most practical instructions was the idol of the farmer's wife. The color-craft of the American Indian supplemented the art of the white man and, as with everything else, scarcely any act of the druggist but what was an act of service. Truly, drug practice was always a profession apart from mere merchandising from its earliest days. And because the drug man's art demanded the pure medicinal aromatic drugs as components of his galenicals, a side-stepping departure from first quality would have been obvious in a finished preparation and perhaps would have made it inferior.

For this reason, select and pure spices were attainable at the drug store only. The capable housewife hardly ever bought her flavoring items outside of a drug establishment. Unbelievably crude adulterations and substitutions made commercial spices anathema and the average cook was ignorant of the cause of unevenness in her kitchen products. It was a boon to the people, totally unrealized by them then, when the Pure Food and Drug Law compelled purity of wares in packages or a statement in what respect it differed, on the labels, though it was rather hard on the druggist, because it took a great deal of the trade in spices to the groceries. It must be recorded here that the sale of spices was originally a part of the American drug business. The modern grocery man complains of the drug man's stealing his wares—spices—a wholly imaginary supposition, for the grocery, to a great extent, at least, took the spice trade away from the druggist. The housewife gradually became aware of the improving quality of grocery spices and ordered ready-to-send packages of them with her other telephoned-for supplies saving her a trip to the drug shop down town for them. Compulsory purity handling by otherwise unversed competitors has caused the druggist to lose much of an esteemed part of his business; a queer conceit—equal purity being enforced on others causes always conforming pharmacists to lose business!

It was most unfortunate that pharmacy was saddled with an unsought contact with whiskey. At no time was it a part of drug handling proper; it was a tool of manufacturing and a necessary, hardly considered item, in a drug stock. It was cheap—could be and was sold by any individual in trade who desired to make it an article of commerce. In the early settlements of fair size there were reputable places which sold it aside from drinking bars: *viz.*, wine and liquor stores. The drinking places proper progressively degraded and nurtured the odious type of saloon keeper, bringing into public and political existence a set of more or less undesirable people. The stores (wineries) had small patronage and dwindled; men almost alone did the purchasing there until the drinking bars competed with the better repositories of strong liquors in supplying the supposedly necessary household wants. Men, as has been indicated, did the buying and at that period did not consider it at all improper or debasing to purchase needed things at bar rooms. Pre-

sumably, by degrees, mostly unwillingly, some weakling druggists may have yielded to pleas of people wishing to avoid the rougher contact with saloons, and supplied intimate customers with small perfectly legitimate quantities of spirits. Especially in cases where a store had been established on a not unusual plan of furnished experience in lieu of furnished capital—the unprofessional partner might have been awake to the reaping of easier dollars, and as a helper at the counter fail to discountenance sales of that character.

This settling down of drug store progress has been tinged with a sympathetic desire to record the fact that the primal druggists never intentionally embarked in business with the idea of being liquor handlers in any way, and that for many decades the majority repulsed trade to that end, while many declined such business at all and for all time.

---

## A LIMITED ENROLMENT SELECTIVE PLAN.*,[1]

BY A. RICHARD BLISS, JR.[2]

It has been stated that "mass production" was one of the major factors responsible for the economic conditions which face struggling humanity to-day. Business and industry have been thoroughly berated for the parts they are alleged to have played in toppling down man's "house of cards." Mass production in education, based upon such fallacies as "a college education for every boy and girl," "all men are born free and equal," etc., is undoubtedly one of the chief factors in education's present plight. In some quarters it appears that the standing and the success of an institution have been measured by the size of its student body, the number of alumni and athletic prowess. "By their fruits ye shall know them" has been disregarded.

In the wild scramble for students during the decades gone by, many professional schools have been possibly as "guilty" as the liberal arts colleges as a whole. Individual fitness and characteristics essential to success in a field of special endeavor have been rather generally ignored, and "entrance credits" have constituted the sole criterion for admission—not to mention, of course, financial ability to pay tuition fees.

A number of years ago a small liberal arts college in the State of Vermont, Bennington College, decided to abandon the traditional plan of demanding all freshmen to follow a fixed and regular prescribed course of study, and introduced in its stead a "tailor-made" plan, whereby each individual freshman's course was specially arranged to fit his needs, interests and temperament, and to bring out his special talents. At the same time, the student body was limited to a few hundred so as to insure personal contact of a profitable character and individual attention.

Right here in Portland, Oregon, Reed College recently announced the adoption of a similar plan for its new freshman class which enters this fall. It is encouraging to see another institution added to the "tailor-made curricula" list. Our institu-

---

* Section on Education and Legislation, A. PH. A., Portland meeting, 1935.

[1] Contribution from the School of Pharmacy of Howard College of Birmingham, Alabama.

[2] Dean of the School of Pharmacy and Professor of Pharmacology, Howard College of Birmingham, Alabama.

tions of higher learning are traditionally slow in adopting new methods and ideas. Some institutions have adopted "limited enrollment" plans after their mass production promotional methods had produced classes so large that they were practically unmanageable, and their lecture rooms, laboratories and dormitories were inadequate for instructing and housing such numbers! A few of the older and wealthier colleges and universities, however, adopted selective limited enrollment plans of a different caliber, but excellence of preparatory scholarship and "intelligence tests" formed the major bases of these plans. Undoubtedly hundreds of young men and women who had made great sacrifices in order to attend college, and whose parents had done likewise, have been profoundly discouraged and gravely disappointed by mass educational methods which fail to assist the student in attaining his most important goal, *i. e.*, preparation and training for meeting effectively and successfully the problems of life.

Not only must the liberal arts institutions which hope to survive the demands of changing conditions follow the example of Bennington and Reed Colleges, but our professional schools must recognize more fully their special responsibilities to the prospective professional student, to the profession involved and to themselves. All too often do we find the "square" professional student striving unsuccessfully to fit himself into professional education's "round hole." In like fashion our "standardizing agencies" must recognize that one educational "pattern" is inadequate for solving education's problems. The specifications of an "Educational Code" are as unsuccessful and impracticable as were those of the recent "National Codes" of business and industry.

On page 3 of "Basic Material for a Pharmaceutical Curriculum," under "Duties of the Pharmacist," one finds this statement of Dr. W. W. Charters, Director of what has been popularly termed "The Charters' Study," *i. e.*, The Commonwealth Study of Pharmacy from a Functional Standpoint:

> "Thirty-three qualities needed for the successful pursuit of pharmacy have been collected, defined and ranked in order of importance. The judgment of pharmacists, faculty members and customers has been secured to see whether or not those traits which are thought to be important by the craft are considered to be equally important by the public for whose service the craft has been established."

On page 105 of the same volume appear these statements:

> "Traits of character and personality constantly control the actions of pharmacists. The successful pharmacist possesses the more important traits to a high degree; the unsuccessful follower of the profession fails to possess them; and the growing pharmacist steadily improves in those traits in which he is weak. The successful pharmacist does not possess all the traits to an equal degree, but he acquires enough of them to a degree sufficient to produce efficiency. The pharmacist should have acquaintance with the traits which are considered essential to professional proficiency. He should also know the means by which these traits are shown and the methods by which they are developed. Mere knowledge about traits and their methods of development is, however, quite futile. Practice in the development of traits until they become ingrained and habitual in controlling the actions of the pharmacist is necessary."

Last fall, the Dean of the School of Pharmacy of Howard College of Birmingham, Alabama, recommended to the President and the Board of Trustees of the institution the adoption of a limited enrollment selective plan of admission designed to eliminate the probability of permitting a student to spend four years in the School of Pharmacy with the odds very definitely against his success in the

practice of the profession. The plan has been adopted and becomes effective this fall.[1] The enrollment will be limited to a relatively small number. This limit has been determined not by the capacities of laboratories, lecture halls and dormitories, but by the requirements of the territory the institution subserves. The total was decided upon after several conferences with members of the State Board of Pharmacy, officers of the State Pharmaceutical Association and local drug clubs. Among the factors taken into consideration were population, densities of population and number of drug stores and registered pharmacists to-day and ten, twenty and thirty years ago; average salaries during these decades; local and foreign chain stores data; State Board statistics; the changes in these numerical data forecast for the next decade.

Excellence of past scholarship will continue as one of the important factors in Howard's selective plan, but of equal importance will be evidence that the prospective pharmacy student possesses or gives very definite promise of developing adequately those traits of character and personality which determine success in the practice of pharmacy. By this plan Howard College of Birmingham will admit to its pharmacy school a *selected, limited* number of first-year students whose traits and promise of trait development forecast, with reasonable surety, future success in practice. Personal conferences with the applicant, his parents and instructors, if possible (or in lieu of conferences with parents and instructors correspondence with these interested individuals), plus "Trait Analysis Charts" filled in by the same individuals provide the data used in determining the applicant's fitness, from the trait standpoint. A copy of the chart is appended.

Practice in the development of essential traits will be instituted as a part of the instruction of the individual student until they become ingrained and habitual in controlling the actions of that particular individual. Howard College of Birmingham, Alabama, is not attempting to produce "super-pharmacists," but its ambition is to train above-average pharamaceutical graduates whose success in performing a special service to mankind is practically insured.

PERSONAL TRAIT REPORT.

Please indicate below the extent to which you judge/the applicant/yourself/to be characterized by the qualities listed below. Such information is regarded as given in confidence, and is accessible only to administrative officers of the College. Put a check (√) in the appropriate spaces to indicate your rating in the several qualities.

| | Above the Average: | | | Average. | Below the Average. | |
|---|---|---|---|---|---|---|
| | Exceptionally. | Distinctly. | Slightly. | | Slightly. | Decidedly. |
| Accuracy | | | | | | |
| Honesty | | | | | | |

(And in order: Dependability, Cleanliness, Ability to Gain Confidence, Service, Intelligence, Courtesy, Judgment, Orderliness, Self-respect, Industry, Neatness, Self-control, Fairness, Concentration, Cheerfulness, Memory, Resourcefulness, Tact, Self-confidence, Perseverance, Coöperativeness, Adaptability, Kindliness, Faithfulness, Initiative, Straightforwardness, Loyalty, Leadership, Attractiveness of Personality, Speed, Forcefulness, Artistic Taste.)

*To be filled in by Principal only:*

What is applicant's approximate standing in his class?

---

* September 1935.

| | Highest. 20% | Second. 20% | Third. 20% | Fourth. 20% | Lowest. 20% |
|---|---|---|---|---|---|
| Do you think him worthy of admission to college? (*Check the answer expressing your opinion.*) | | | *in character?* | ( ) very exceptionally<br>( ) exceptionally<br>( ) clearly<br>( ) probably<br>( ) doubtfully<br>( ) not at all | |
| | | | *in preparation?* | ( ) very exceptionally<br>( ) exceptionally<br>( ) clearly<br>( ) probably<br>( ) doubtfully<br>( ) not at all | |

NOTE: An applicant who stands in the 1st Quintile (20%) of his class is eligible; if in the 2nd Quintile and recommended by the principal, he is eligible but may be required to take subject examinations; if in the 3rd Quintile but otherwise exceptionally qualified, he may be considered for admission by examination; with any lower standing he is not eligible for admission.

---

## COÖPERATIVE RESEARCH.

Liebig wrote: "The achievement of our joint work (with Wöhler) upon uric acid and oil of bitter almonds has frequently been praised; it was his work. I cannot sufficiently highly estimate the advantage which the association with Wöhler brought to me in the attainment of my own as well as of our mutual aims, for by that association were united the peculiarities of two schools—the good that was in each became effective by coöperation. Without envy and without jealousy, hand-in-hand, we plodded our way; when the one needed help, the other was ready. Some idea of this relationship will be obtained if I mention that many of our smaller pieces of work which bear our joint names were done by one alone; they were charming little gifts which one presented to the other."

Wöhler, on the other hand, wrote as follows:

"We two, Liebig and I, have dissimilar kinds of talent; each, when in concert, strengthens the other. No one recognizes this more fully than Liebig himself, and no one does me greater justice for my share of our common work than he."

The performance of coöperative research on the part of two scientists of equal eminence, such as Liebig and Wöhler, depends for its success upon mutual good-will, an absence of all envy, jealousy or suspicion and a complete renunciation of all motives of personal profit. This requirement places a severe tax upon some inherent traits of human nature, and some attempts at cooperative research have been shattered because of a suspicion on the part of one of the participants that his collaborator was reaping an undue share of the honor or gain. Yet there are many outstanding examples of brilliant pieces of coöperative research.—Quoted from an article in *Science*.

---

## ST. LOUIS DELEGATION TO DALLAS.

The St. Louis delegation have arranged to operate special train or sleepers depending upon the number in our delegation who will congregate at St. Louis and Kansas City. This special train will leave St. Louis on Sunday, August 23rd, at 5:30 P.M., arriving in Dallas, 9:30 A.M., August 24th.

This train will be operated for the exclusive use of our delegates and will be completely air-conditioned. Members are invited to communicate with Alfred W. Pauley, 1507 So. Spring Ave., St. Louis.

# THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C. B. JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A. A. C. P., EDITOR OF THIS DEPARTMENT.

Pharmaceutical educators and pharmacists in general are well aware of the attitude of Dean F. J. Wulling of Minnesota on the question of proper educational training for pharmacists. Your Editor is convinced that the future of pharmacy will depend upon the training the colleges of pharmacy give their graduates and the number of trained pharmacists we turn into the profession. Dean Wulling's paper on "The Future of Pharmacy" is a contribution that will be of interest to all who have the welfare of our profession at heart. We all hope that Dean Wulling will continue to exert his influence for the better training of pharmacists, even though he has retired from the deanship of the College of Pharmacy of the University of Minnesota. It seems most fitting that he should express, on the eve of his retirement, his well-decided views on the future of the profession that he has served so long and so faithfully.—C. B. JORDAN, *Editor*.

## THE FUTURE OF PHARMACY.

BY FREDERICK J. WULLING.*

While I was still in the grammar school, I began reading medicine with our family physician whom I had given some assistance in an emergency and on the basis of which he advised me to take up medicine. I had access to his library and began reading and studying according to his directions. He allowed me to assist him in his office practice where I gathered much practical information. Later he took me, as my time permitted, on his rounds to patients within the town and near vicinity. When four years later I definitely entered pharmacy for a life work I had had considerable medical experience and information. Later I continued my medical training to a point beyond that which had been usually observed up to that time. I can therefore say that now, upon the eve of my retirement from the University of Minnesota on July 1, 1936, I have had fifty-six years of training and experience, mostly in fields related to pharmaceutical educational administration. Of these, forty-four years were devoted to the organization and building up of the College of Pharmacy of the University of Minnesota. Since 1910 I have had experience in University administration, having been advanced in that year to membership in the University Administrative Committee.

Because of this long term of service and experience I have been asked recently by high educational administrators, my own University President among them, what the future of pharmacy is. The nature of an answer to this question depends somewhat upon who asks it and what motive or intention is back of the question and also upon the attitude of the person replying. If both the questioner and the one replying belong to that fairly large class which is unfavorably disposed toward the professional and scientific aspect of pharmacy and more friendly to the commercial expansion of certain present drug store practices, the report and possibly the recommendations of such a conference would be anything but affirmative for the rapid rehabilitation of true pharmacy. This matter of negation of true pharmacy has had ventilation and support in the pharmaceutical press and at pharmaceutical

* Dean of College of Pharmacy, University of Minnesota.

conventions and other gatherings so that it is really imperative to advocate again, but more emphatically than ever before, the consideration and the study of the pharmaceutical situation by those who have the true viewpoint that pharmacy is one of the three most important private and public health factors and that it must be thought of and developed in that light. This is really an old story. Its advocates have saved and maintained pharmacy in its true relation to the other health professions and to the public until now and they will continue this maintenance, alone if necessary.

Matters, pharmaceutic in all their various relationships, have been kept very closely within the limits of the calling of pharmacy itself but the time is here when other factors are coming into the picture. Among these are legislatures and higher institutions of learning, certain colleges of pharmacy, educators in other science fields, particularly in medicine and dentistry, etc. These all, as far as they are giving consideration to the matter, are discussing it from two principal standpoints, (1) the economic, and (2) the educational.

The legislators of at least some states which support colleges of pharmacy are beginning to consider the expenditures involved in the training of a greater number of pharmacists than are needed to render the pharmaceutical service which the public needs. Up until recently I have never heard legislators discussing this aspect. Now, some of them feel that the practice of true pharmacy should be separated from the dual practice which includes trade and thus reduce very materially the number of students to be educated by the state for pharmacy. If this viewpoint were carried out by legislation, the situation in some of the rural and more sparsely settled regions would become difficult for some people. In that respect, no difficulty should be encountered in the towns and cities. Some legislators feel keenly the need of reducing taxes. They are thinking of many ways of doing so. A certain legislator who has discussed this matter with some of his colleagues, gave me what I believe to be an exaggerated estimate of one million dollars or more as representing the possible savings annually if state education of pharmacists were restricted to those who would practice pharmacy exclusively. He admitted, upon my pointing out that fact, that some difficulty would be encountered in legislation to separate pharmacy from the trade carried on in so many drug stores but he felt certain that with an open-minded discussion and study of the situation from all angles, such legislation could be enacted within the next ten or a dozen years.

In the second place, some educational institutions such as, for example, the University of Minnesota, are studying the matter from the educational side. The question of the relation of medicine, dentistry and pharmacy to one another and collectively as health sciences to the public is being studied. There is no clear decision as to the basis upon which this study and possible recommendations resulting from it should be made but force and emphasis attach to the proposal that the bases be two-fold: (1) the curricula and (2) the responsibility involved in the respective practices. Some are already agreed that the practice of pharmacy is as responsible with relation to life and death as medicine and dentistry. Some physicians have stated to me that they regard pharmacy as the more dangerous to practice. I need not go into the reasons stated here.

The study, therefore, relates principally to the educational necessities. If the respective responsibilities attaching to the practice of the three professions do not

vary very much, as they do not, then the educational question should naturally and equitably be settled upon an equality of education, both qualitatively and quantitatively, of aspiring practitioners in these three callings, as far as equality can be established in those respects in curricula which have not the identical but closely related objectives. A partial evidence that the colleges of pharmacy are tending toward that viewpoint more and more is borne out by the fact that all the colleges of the Association have been on the minimum four-year basis since 1932. This is a step in the approach toward what should become the objective of all colleges, namely, an educational parity with colleges of medicine and dentistry. The rate of advancement in dental and medical education has been greater than in pharmaceutical education, probably for the reaons that the majority of physicians and dentists have seen the desirability as well as the necessity of such advancement, but these have not seen clearer than many pharmacists have, but those pharmacists who have clear perception and a sound conviction as to the need of more rapid pharmaceutical, educational advancement are in the minority. The attenuation of the practice of pharmacy through the accession to pharmaceutical ranks of many who have no adequate professional and scientific ideals, and for which situation professional pharmacy is not so much to blame as is the public, accounts for the lesser collective insistence on a more adequate training for pharmacists in general. The colleges of pharmacy and individual leaders in pharmacy are giving in a large measure the same study and consideration to better pharmaceutical education as leaders in medicine and dentistry are giving to their education.

Some pharmaceutical educators have definite ideas as to a program to place pharmaceutical education on a par with education in medicine, dentistry and other professions. The first step is a very simple one, namely, improving the personnel of pharmacy by advancing the minimum course to five years at once or within the next few years and advancing another year to six years for the course, say in ten years; and then, having reached a parity with medical and dental education, taking action from time to time to keep on a par with medicine and dentistry as they may raise their requirements.

My colleagues and I have been considering ever since 1926, when the College of Pharmacy of the University of Minnesota went upon the four-year basis, the advisability of a five-year course, and last fall definitely recommended to the President of the University the advancement of pharmacy here at the University of Minnesota to a parity with Dentistry, Law, Education, Business, etc., in preprofessional preparation of two years, that is, to an advancement of a minimum five-year course. President Coffman of the University has the matter under study and advisement. He has permitted me to include in this paper some of the reasons we gave for the request and I reproduce a few of them here:

1. Pharmacy is a major division of medicine. Indeed, many call it the chief medical specialty. Because it has to do with life and death, many, including physicians, regard it as a profession carrying as much responsibility as medicine. Its importance as a health science and service is probably less, quantitatively, than that of medicine but because of the medical and responsible nature of pharmacy, qualitatively it is on a par with medicine. For these reasons alone pharmacy should reach a parity with medicine in the prepharmaceutic education and training of its practitioners.

2. The University colleges representing the other health sciences require a two-year pre-requisite to their respective technical courses. Pharmacy is as much a health science as medicine and dentistry.

3. When the University made the optional four-year course the obligatory one in 1926, the understanding was that the advancement was only a partial step and that soon pharmacy would be advanced to an academic and cultural standard equal to that of medicine and dentistry.

4. In 1929 or 1930 the student body in the College of Pharmacy petitioned for a five-year course for the degree B.S. in Pharmacy. This petition was based upon the fact that the majority of students come with advanced standing, mostly academic. What was meant is better understood by the following table showing the advanced standing of students who entered in 1929:

1.92% had seven years of previous college training
1.92% had three years of previous college training
3.84% had more than two but less than three years of previous college training
21.15% had two years of previous college training
5.77% had more than one year but less than two years of previous college training
42.3 % had one year previous college training
1.92% had less than one year of previous college training
21.15% had no previous college training
99.97%

I also quote from the 1932 Proceedings of the Minnesota State Pharmaceutical Association. In a Committee Report there printed the pharmacists of Minnesota expressed themselves as follows:

"This voluntary preliminary preparation on the part of students points directly to a minimum five-year course on the two and three plan, that is, two years of basic academic work and three years of purely technical pharmaceutical work, as the next logical progressive step in pharmacy. In the past advancements have been initiated by the pharmacists and never by the students. We are in a new order of things and the students are suggesting or designating in a consistent and intelligent way what they desire in the matter of college training. Every pharmacist is an asset to his community, to the state and to the nation. The greater and more general as well as specialized his training is, the more valuable is he as an asset, and the better off in that respect and degree is the community, the state and the country. With this enterprise on the part of students, the pharmacists should be greatly pleased. They should encourage and stimulate it. The University does so and so does your committee. Your committee is bringing this fact to your attention not only as a matter of information but as well for the purpose of asking for a reaction to, or a discussion of, the proposal of increasing the present course to five years. Doing this would have sufficient affirmative effects. The most important one of course is that of injecting into the profession of pharmacy men and women of a type needed to keep pharmacy abreast with the advancement, in every respect, of other professions. A minimum five-year course would also very probably reduce the number of recruits, which has been altogether too large of late, and which has created strong competition for those already established in business."

Please note that the Committee asked for a reaction to the proposed five-year course. Not a single objection on the part of the members of the State Association was made upon the convention floor of that meeting or of any later meetings. The State Association, The College of Pharmacy and the State Board of Pharmacy have always coöperated in matters common to them. No progressive steps were ever taken by the College which the Association did not approve sooner or later. There was much opposition from some of the pharmacists to the advancement of the two-

year course to the three-year course and again, but in a lesser measure, when the three-year course was advanced to four years. The objections heard in those early days were always answered duly by the College in a way satisfactory and convincing to the objectors. Since the minimum four-year course has been in operation, the support of the pharmacists has increased markedly. The pharmacists were responsible for the passage by the Legislature of the law making graduation from the four-year course mandatory for all who desire to take the Board examinations for registration to practice. This law was passed on the initiative of the pharmacists because they had become tired of procrastination on the part of a comparatively few pharmacists to support the four-year requirement.

The question of the proposed five-year course has now been before the pharmacists for six or seven years without any protest against it except that an occasional pharmacist expressed doubt whether students would attend for so long a time. Students have removed this doubt by their own demand for a five-year course.

I desire to quote the pharmacists further. In the 1931 State Pharmaceutical Association Proceedings, the College of Pharmacy Committee says:

"The College has recently been requested a number of times to organize a five-year course and give an appropriate degree for its completion. The request grew out of the fact that for the past several years many of the matriculants came with advanced standing. Last year the percentage of enrollment of new students coming with advanced standing reached 88 per cent and this year 73 per cent. Of last year's matriculants exactly 50 per cent had completed the Junior College course of two years. They will graduate in three years after entering or after having completed what is designated by some Universities as the two and three requirement, meaning the completion of two years of academic or general college work and three years of technical pharmaceutical work. These students would like a degree higher than the one granted for the present four-year course. Possibly in the near future this demand on the part of students will result in a five-year minimum course. If that point is reached, pharmacy will have aligned itself with such professions as medicine, dentistry, law, education, business, all of whom already require the completion of the two-year Junior College course before admission to technical or professional work. At present pharmacy is behind all of the University Colleges representing these six professions, and in that respect has to take a secondary place on the Campus. The pharmacists of the State, through the State Association, were definitely instrumental in getting the four-year course established as the minimum course. Possibly the pharmacists through this Association, may take the initiative toward placing pharmacy in this State educationally on a par with the professions named, and who are no more important than pharmacy if rated in the light of the responsibility involved in the practice. Mistakes in the practice of pharmacy may result in death, thus establishing a responsibility for the practice that is a very serious one and one which is not exceeded in the practice of other professions."

The following is quoted from the report of the Committee on the College of Pharmacy to the State Association in February 1933:

"The enrollment of the College has suffered no diminution in these years of depression despite the fact that it is in its early years of the minimum four-year course which went into effect in 1926. This College was the first to go upon this minimum four-year basis.

"The four-year course, however, is not the ultimate course for Pharmacy because Pharmacy must consider itself with relation to the course of other professions. All of the recognized professions are represented in their educational aspects by minimum five-year courses."

The 1934 Committee gave a lengthy report on the College and said among other things:

"The outstanding position which our College of Pharmacy occupies not only in our own State but wherever colleges of pharmacy are situated, is recognized everywhere. No college of phar-

macy has reached a higher educational status than our own. This fact should be recognized by Minnesota pharmacy and support given accordingly to what the College is doing for pharmacy and so we recommend again that the Association go on record as supporting the endeavor of the College to secure more adequate quarters and equipment and a general expansion to go with these, up to a parity with medicine and dentistry in preprofessional work."

The faculty, the pharmacists and the students all have declared themselves in favor of the proposed five-year course. What the Regents of the University will do with the recommendation of course remains to be seen but the President and the Regents have always been sympathetic with reasonable advancements.

In my judgment therefore, there is no question about the future of pharmacy. It will steadily become more professional and scientific. Pharmacy itself must and, I believe, will more fully recognize and assert its own inherent professional and scientific nature and must more fully realize its relation to public health collectively with medicine and dentistry. It can expect material assistance from higher educational institutions but only if it places a sufficiently high and true evaluation upon itself. The difference in public estimation of the various professions is based primarily, but not entirely, upon the educational standards of the respective professions. As soon as pharmacy realizes this fact sufficiently it will promptly, either alone or with assistance, work for and reach more adequate educational standards.

I have a general program for the development and expansion of colleges of pharmacy which I will be glad to publish if there is request to that end.

---

## THE CULTIVATION OF TEA IN THE PACIFIC NORTHWEST.

BY LOUIS FISCHER AND FREDERICK F. JOHNSON.*[1]

Two species of Japanese tea were obtained and cultivated, namely: 1. *Thea Sinensis, Theaceæ* (*Camellia Thea*, Link, *Camellia theifera*, Griff), *var. viridis.* 2. *Camellia Japonica, Theaceæ*, common variety.

A description of this *Thea Sinensis* is as follows:

Leaves oblong-lanceolate, acute, often concave, light green, to 5 inches long; flowers white, 1 to 4; sepals pubescent, ciliate; petals 5 to 9; styles free; branches spreading.

A description of this *Camellia Japonica* is as follows:

Glabrous shrub or tree; leaves ovate or elliptic, acuminate, very shiny and dark green above, 2 to 4 inches long; flowers red, 3 to 5 inches across; petals 5 to 7, round; ovary glabrous. White and pale rose and various double kinds. There are many named varieties.

Only the *Thea Sinensis* will be discussed in regard to cultivation as both species behaved similarly in this respect.

One-quarter pound of seeds was obtained in 1924 from T. Sakata and Co., Yokohama, Japan. They were planted in a greenhouse and maintained at a temperature of 60–65° F. The soil was a rich garden loam consisting of black soil, leaf mold, and sand with no added fertilizer.

* The authors wish to acknowledge the helpful assistance rendered over a period of years by Mr. Ludwig Metzger, caretaker of the eight acre University of Washington Garden of Medicinal Plants; also, the facilities of the University of Washington Experimental Pack Forest on the slopes of Mt. Rainier.

[1] University of Washington, College of Pharmacy, Seattle.

Of the one-quarter pound of seeds, eight seeds sprouted and formed plants. After four years the plants were 8 to 12 inches high. At this time seven plants were transplanted into the open and were grown in a rich loam with bone meal added. All seven plants grew and developed, growing to a height of about 30 inches at the present time, although their growth was hindered by several unavoidable transplantations. The first blossom appeared in 1929 and blossoms have continued every year. The first seeds were collected in July 1931 and the second seeds in October 1933. The seeds appeared normal but did not develop. A record of temperature was kept for the period of growth from 1928 to 1933. During this interval the temperature at one time dropped to the unusual level of 6° F. During this cold spell the roots were protected but the leaves were left unprotected; three plants were lost.

Two hundred and fifty seeds from the plants growing outside were collected and planted in January 1934; 17 sprouted; 695 of the same seeds were planted in March 1934 and 2 sprouted. Eighteen cuttings from the greenhouse plant were planted outside in October 1933 and 16 grew. The plants seem to grow better when protected from extremely bright sun.

Many more seeds have been received from Japan since 1924 but only those which were received and planted in 1924 have grown. In March 1934, 600 seeds were received from Tamokie Company, Tokyo. Four hundred were planted outside and 200 were planted in a hot bed in the green house. All failed to grow. In view of this, another quantity was ordered from the same source and was received in November 1934. The shells of 180 seeds were opened and only 45 appeared to be in good condition. It has been our experience that seeds which are stored for a month or more usually will not sprout.

It has been reported that tea will grow best at an altitude of about 1000 feet. In order to observe this, some plants were transplanted as follows:

Three large cuttings and 3 seedlings at 1150 feet.
Three cuttings and 3 seedlings at 800 feet.
Four cuttings and 4 seedlings at 100 feet near the salt water.

All cuttings were lost and all seedlings have done well. The determination of the effect of altitude on the chemical composition of tea must await further development. No effect upon growth was noted except a retardation at 1150 feet due to the severe winters.

| | *Thea Sinensis.* | | *Camellia Japonica.* |
|---|---|---|---|
| | New Leaves. | Old Leaves. | New Leaves. |
| Loss of moisture on air drying | 67.76% | 57.17% | 60.77% |
| Moisture in air-dried leaves used for analysis | 5.82 | 5.93 | 4.98 |
| Ash | 4.84 | 4.40 | 5.53 |
| Water-insoluble ash | 2.51 | 2.32 | 2.17 |
| Acid-insoluble ash | 0.05 | 0.03 | 0.00 |
| Petroleum ether extractive | 2.45 | 3.90 | 1.93 |
| Volatile petroleum ether extractive | 0.26 | 0.36 | 0.19 |
| Ether extractive | 2.92 | 2.67 | 1.20 |
| Volatile ether extractive | 0.24 | 0.20 | 0.12 |
| Alcohol extractive | 39.97 | 38.19 | 22.14 |
| Volatile alcohol extractive | 5.33 | 4.92 | 2.91 |
| Water extractive | 15.98 | 15.55 | 18.41 |
| Total nitrogen | 2.46 | 1.87 | 1.75 |
| Protein | 13.06 | 10.25 | 10.37 |
| Crude fiber | 13.70 | 10.02 | 18.24 |
| Caffeine | 1.25 | 0.83 | 0.27 |
| Tannin | 7.26 | 6.22 | 5.25 |

Leaves of the plants from the locally grown seeds were collected for analysis in July. The four young leaves nearest the tip were collected and the leaves which

were one year old were collected separately and dried at room temperature. The analyses were made by the methods of the Association of Official Agricultural Chemists.

SUMMARY.

During a period of 12 years two species of Japanese tea have been acclimatized successfully and grown from seed in the Northwest. An analysis of the leaves is reported. The University of Washington College of Pharmacy will continue this work with the hope that tea cultivation eventually may become commercially profitable in this region.

## A COLOR TEST FOR LECITHIN.

EDSEL A. RUDDIMAN.*

A search has been made for a test for the identification of lecithin other than the determination of the presence of phosphorus and nitrogen in compounds which are soluble in alcohol and petroleum ether and insoluble in acetone or methyl acetate. The lecithin used in these tests was the ordinary commercial preparation which was repeatedly purified by dissolving in petroleum ether and precipitating with acetone.

Many color reagents and reagent mixtures have been applied to lecithin but only one, namely, sulphuric, gave any characteristic color test. A smear of lecithin on a watch glass rubbed with a small portion of a drop of concentrated sulphuric acid became violet colored after a few minutes, following which the color slowly faded. Slightly warming the mixture hastened the reaction. In order to obtain a positive test it was found that the lecithin had to be sufficiently free of impurities to prevent masking of the violet color by other colored reaction products. The presence of water or alcohol lessened or prevented the formation of the violet color. Lecithin was found to give a violet color with nearly every reagent which contained sulphuric acid as one of the ingredients. It is not known whether the color results from the action of sulphuric acid on lecithin itself or on some accompanying impurity not removed by ordinary purification. Furthermore it cannot be claimed that the test is specific for lecithin, but under the conditions of the test it is strongly indicative of its presence. The test is very delicate as less than 0.001 gram of 65 per cent commercial lecithin gives the coloration.

* Engineering Laboratory, Ford Motor Company, Dearborn, Michigan.

More than twenty-five common articles of food, such as beets, peas, lettuce, tomatoes, apples, wheat, corn, almonds and meat, when tested in the following method gave the violet color. The material was dried, coarsely ground, extracted with alcohol and the extract evaporated to dryness. The residue was reëxtracted with petroleum ether, and the petroleum ether evaporated. The appearance of a violet color when a smear of the final extract is treated with a drop of sulphuric acid is indicative of lecithin in the original product.

## STERILE AND STERILIZATION.

The Council on Pharmacy and Chemistry has formally gone on record "as disapproving of the use of the terms sterile, sterilize and sterilization in a bacteriologic sense other than in their correct scientific significance; *i. e.*, meaning the absence or destruction of all micro-organisms. These terms are not relative and to permit their use in a relative sense not only is incorrect but opens the way to abuse and misunderstanding. It is questionable that there are any chemical agents tolerated by the skin which will produce sterility, although there are some which will reduce the bacterial flora of the skin to such an extent that they may properly be described as disinfecting agents. For such agents there is no objection to the use of the terms *disinfecting*, *bactericidal* and *bacteriostatic*."

It is announced in *Arch. Pharm. og Chemi* that Docent S. A. Schou has been appointed Professor of Pharmacy at the Pharmaceutical Institute (Farmaceutiske Laereanstalt) in Denmark. Professor Schou has an international reputation for his researches in the application of physical chemistry to pharmacy, and the Danish journal comments on the value of his appointment for the strengthening of scientific pharmacy in that country.

# ASSOCIATION BUSINESS

## AD INTERIM BUSINESS OF THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1935–1936.

Office of the Secretary, 2215 Constitution Ave., Washington, D. C.

### LETTER NO. 25.

July 13, 1936.

*To the Members of the Council:*

*157. Use of Text of N. F.* Motions Nos. 72 and 74 (Council Letter No. 24, page 643) have been carried and the parties to whom permission is granted are being so advised.

*158. Election of Members.* Motion No. 73 (Council Letter No. 24, 644) has been carried and applicants for membership numbered 393 to 433, inclusive, are declared elected.

*159. Committee on Pharmacy Week.* The attached comments on the Suggested Plan for the Reorganization of the Pharmacy Week Movement (Council Letters No. 22, page 555, and 23, page 642) have been received from Messrs. Cook and Hayman. If no additional comments are received within one week, a vote will be called for on Motion No. 68.

*160. Tentative General Program for the Eighty-Fourth Annual Meeting.* No comments on the General Program have been received and a vote on Motion No. 75 (Council Letter No. 24, pages 644 and 645) is called for at this time.

E. F. KELLY, *Secretary.*

### LETTER NO. 26.

July 24, 1936.

*To the Members of the Council:*

*161. Use of Text of N. F. VI.* The following letters have been received from Chairman DuMez of the Committee on Publications:

> "Inasmuch as Dean Theodore J. Bradley was granted permission to use portions of the text of the N. F. V for comment in his Laboratory Manual of Qualitative Chemical Analysis, it is recommended that he be granted permission to use portions of the text of the N. F. VI for comment in the revised edition of his Laboratory Manual and that the customary fee of $5.00 be charged for this grant."
>
> "In reply to your letter of the 20th, it is recommended that permission be again granted to Dr. Samuel M. Gordon, Secretary of the Council on Dental Therapeutics, to use portions of the text of the N. F. VI in the annual revision of Accepted Dental Remedies. It is my understanding that no fee has been charged for this grant in the past and it is therefore recommended that no fee be charged on this occasion."
>
> "I have read the request of Mr. Paul Caldwell to use certain titles for N. F. VI preparations in the preparation of a booklet for distribution among physicians, and have reached the conclusion that it is really unnecessary for Mr. Caldwell to secure permission from the A. PH. A. to use the N. F. titles as indicated in the pages of manuscript submitted. Nevertheless, it may be desirable that the Council take some action on this matter to keep our records straight. I therefore recommend that permission be granted Mr. Paul Caldwell to use portions of the text of the N. F. VI in the preparation of a booklet for distribution to physicians, and that no fee be charged for this privilege."

(*Motion No. 76*) It is moved by DuMez that Theodore J. Bradley, the American Dental Association and Paul Caldwell be granted permission to use the text of the N. F. VI in a revision of a Laboratory Manual of Qualitative Chemical Analysis, in the annual revision of Accepted

Dental Remedies and in a booklet for distribution to physicians, respectively, with the customary acknowledgment, in each case, and the usual fee of $5.00 in the first case.

*162. Committee on Pharmacy Week.* The attached comments have been received from Messrs. Swain and Fischelis. In view of the comments so far received and of those that may be received later, a vote on Motion No. 68 will be deferred until the meeting of the Council in Dallas, unless there is objection (Council Letter No. 22, page 555; 23, page 642; and 25, this issue).

*163. General Program of the Eighty-Fourth Annual Meeting.* Motion No. 75 (Council Letters Nos. 24, page 643, and 25, this issue) has been carried and the program is approved as submitted. Dr. Fischelis submitted the following comment and suggestions:

> "I am returning my voting card on Motion No. 75 and while I approve the program as outlined, I do not approve scheduling the meeting of the Council on Sunday. I think this should be scheduled on Saturday preceding the Convention in order to give us time enough to complete all of the work which no doubt has accumulated since the last meeting of the Council. I am afraid if you let it go until Sunday, you will not have the time for deliberation as we will doubtless be busy morning, afternoon and evening, just as we have been in the last few years.
>
> "My suggestions would be to have the Council meet on Saturday and leave Sunday open for a supplementary meeting which may be necessary."

*164. Applicants for Membership.* The following applications, properly endorsed and accompanied with the first year's dues, have been received:

No. 434, Louis Eleazer Ball, 69 Borden St., Toronto 4, Ont., Canada; No. 435, Charles Hayden Alexander Streamer, Haddon & West Knight Aves., Collingswood, N. J.; No. 436, Charles Solomon, 1265 President St., Brooklyn, N. Y.; No. 437, Paul Goedrich, 133 Heller Parkway, Newark, N. J.; No. 438, Carl C. Beighley, 707 W. Crawford Ave., Connellsville, Pa.; No. 439, Lucille Maud Mills, 1660 Van Dorn St., Lincoln, Nebr.; No. 440, Louis Weiner, 1227 W. Columbia Ave., Philadelphia, Pa.; No. 441, M. Maurice Fierman, 829 Jaucey St., Pittsburgh, Pa.; No. 442, Harley Earl Baker, 3813–33 St., Mt. Rainier, Md.; No. 443, William C. Field, 4006 14th St., N. W., Washington, D. C.; No. 444, Orlando G. Hall, 3818 7th St., N. W., Washington, D. C.; No. 445, Irwin I. Bonn, 930 Emerson St., N. W., Washington, D. C.; No. 446, Frank F. Lilly, 4931 Butterworth Pl., N. W., Washington, D. C.

(*Motion No. 77*) Vote on application for membership in the AMERICAN PHARMACEUTICAL ASSOCIATION.

*165. Semi-Centennial of the National Formulary.* Recently Chairman Gathercoal discussed with the Chairman of the Council and the Secretary the desirability of celebrating the semi-centennial of the movement which has resulted in the National Formulary, during the Dallas meeting, and was requested to submit the proposal in writing for submission to the Council. The following quotations are from a letter received from Chairman Gathercoal:

> "In view of the fact that the A. PH. A. Committee on Unofficial Formulas presented a report at the annual meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1886 and that this report was embodied, along with 414 monographs on unofficial preparations, in the Proceedings of the ASSOCIATION for that year, it seems to me very desirable to recognize at our 1936 annual meeting the semi-centennial of this work. It is true that the report of this Committee was not published as a separate volume under the title of the *National Formulary of Unofficial Preparations* until 1888. However, each succeeding edition has been issued in the decennial year "6."
>
> "As to the nature of this semi-centennial recognition I think that your suggestion of setting aside an hour or so at one of the general sessions or at some other appropriate time during the meetings is very good.
>
> "It would be fitting if all of the persons who were associated with the work that led to the establishment of the publication and those who have served on the several revision committees, and who are now living and in health, be present as a body. There are at least two men who have served on four of these committees; others have served on three or two of the committees and a few, like myself, have served on only one. I thought also that we might have prepared a chart to show the names of all

who have served on these committees and the periods for which they have served.

"It would be very desirable to spend a little time from the historical or the reminiscent standpoint; considerable time on the present book; and some time looking into the future. However, the affair should not be too much drawn out and should be enlivened with a number of items of real interest.

"We might show photographs of the committees; also the complete set of books. We could have a chart indicating the types of preparations found in the several editions. If you have no objection I could have the same chart that has been used several times this year remimeographed and used again.

"It would be very desirable to ask Secretary Nichols and other members of the Committee for suggestions as to how this semi-centennial could be made attractive and of real interest.

"I must be excused from taking any part other than perhaps a very few words as Chairman of the Committee. This should be an occasion when those not on the Committee do most of the talking."

In an editorial in the December 1935 issue of the JOURNAL, A. PH. A., page 1051, the following comment is made:

"Fifty years ago, at the Pittsburgh meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION, Charles Rice, as chairman of a committee, presented a proposition for a 'National Formulary of Unofficial Preparations' under the auspices of the AMERICAN PHARMACEUTICAL ASSOCIATION."

The celebration can be included in the program of the First General Session on Wednesday morning, August 26th. Comments from the members of the Council are invited.

E. F. KELLY, *Secretary.*

## LETTER NO. 27.

August 4, 1936.

*To the Members of the Council:*

*166. Use of Text of N. F. VI.* Motion No. 76 (Council Letter No. 26, this issue) has been carried and those to whom permission was granted are being so advised.

*167. Committee on Pharmacy.* Since no objection has been offered, a vote on Motion No. 68 will be deferred until the meeting of the Council in Dallas (Council Letters Nos. 24, page 644; 25, this issue; and 26, this issue).

*168. Election of Members.* Motion No. 77 (Council Letter No. 26, this issue) has been carried and applicants for membership numbered 434 to 446, inclusive, are declared elected.

*169. Semi-Centennial of the National Formulary.* No comments have been received with respect to Chairman Gathercoal's proposal (Council Letter No. 26, this issue) and the following motion is submitted to reach a decision.

(*Motion No. 78*) It is moved by Kelly that the Semi-Centennial of the National Formulary be celebrated at the First General Session of the Dallas meeting, August 26th, as suggested by Chairman Gathercoal. In view of the short time intervening, a vote is called for now.

*170. Addition to the Budget for 1936.* During the third meeting of the Council in Portland last year, $20.00 was added to the Budget for 1935 for the expenses of the Committee on Horticultural Nomenclature (see Item No. 139, Council Letter No. 22, A. PH. A. JOURNAL, August 1935, page 704). Chairman Youngken has recently submitted a bill for $17.80 and as the previous appropriation lapsed with 1935, the Acting Chairman of the Committee on Finance recommends that a similar addition be made to the Budget for 1936 in order that the bill can be paid.

(*Motion No. 79*) It is moved by Kelly that $20.00 be added to the Budget for 1936 to cover the expenses of the Committee on Horticultural Nomenclature for 1935–1936. A vote is called but will be considered as tentative if there is objection or if any member wishes to submit comments.

*171. Applicants for Membership.* The following applications, properly endorsed and accompanied with the first year's dues, have been received:

No. 447, John N. McDonnell, 409 Old York Road, Jenkintown, Pa.; No. 448, Zachariah V. Kerrigan, 5479 Delmar Blvd., St. Louis, Mo.; No. 449, Shalom Semah Shalom, 47, Pharmacists, St., Ashar, Basrah, Irag.; No. 450, Sigurd Sigurdson, Bottineau, N. Dak.; No. 451, Israel Thomas Reamer, Duke Hospital, Durham, N. Car.; No. 452, Pearl Glauser Block, Abington Memorial Hospital, Abington, Pa.; No. 453, Sister Anna de Sales, 1442 Chapel St., New Haven, Conn.

(*Motion No. 80*) Vote on applications for membership in the AMERICAN PHARMACEUTICAL ASSOCIATION.

E. F. KELLY, *Secretary.*

---

## REPORT OF THE TREASURER OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, JANUARY 1 TO JUNE 30, 1936.

*Current Funds:*

| | Jan. 1, 1936. | June 30, 1936. |
|---|---|---|
| Savings and Checking Accounts | $ 1,185.26 | $ 15,987.96 |
| Secretary's Account | 1,638.61 | 1,716.48 |
| Total | 2,823.87 | 17,704.44 |

*Permanent Funds:*

| | | |
|---|---|---|
| Endowment | 17,273.60 | 17,523.30 |
| Centennial | 6,098.77 | 6,170.80 |
| Ebert Legacy | 8,916.38 | 9,072.01 |
| Ebert Prize | 1,076.63 | 1,091.01 |
| Life Membership | 33,828.53 | 34,450.69 |
| Endowed Membership | 129.05 | 129.05 |
| Research | 68,138.54 | 67,915.81 |
| Headquarters Building, Bonds and Cash | 16,060.67 | 13,917.26 |
| Headquarters Building, Property and Equipment | 536,847.06 | 537,795.56 |
| Total | 688,369.23 | 688,065.49 |

*Trust Funds:*

| | | |
|---|---|---|
| Procter Monument | $ 18,487.80 | $ 18,800.55 |
| Remington Honor Medal | 1,331.22 | 1,355.09 |
| Frederick B. Kilmer Fund | ..... | 3,000.00 |
| Total | $ 19,819.02 | $ 23,155.64 |

*Summary of Funds:*

| | | |
|---|---|---|
| Current | $ 2,823.87 | $ 17,704.44 |
| Permanent | 688,369.23 | 688,065.49 |
| Assets | 691,193.10 | 705,769.93 |
| Trust | 19,819.02 | 23,155.64 |
| Total | $711,012.12 | $728,925.57 |

SCHEDULE OF DEPOSITS, SECURITIES AND PROPERTY.

*Deposits:*

| | | |
|---|---|---|
| Baltimore National Bank | | $ 17,383.38 |
| Merchants and Newark Trust Co. | | 15,562.84 |
| Boston Penny Savings Bank | | 438.48 |
| Baltimore Trust Co. | | 5,928.05 |
| Maryland Trust Co. | | 13,717.26 |
| Total | | $ 53,030.01 |

*Securities:*

| | | |
|---|---|---|
| Treasury Bonds, 2¾% | $ 17,400.00 | |
| Treasury Bonds, 2⅞% | 18,500.00 | |
| Federal Farm Mortgage Corporation Bonds, 3% | 1,000.00 | |
| State of Illinois Bonds, 4% | 6,000.00 | |
| State of Massachusetts Bonds, 3% | 14,000.00 | |
| State of North Carolina Bonds, 4½% | 7,000.00 | |
| State of Tennessee Bonds, 4½% | 3,000.00 | |
| City of Baltimore Bonds, 4% | 40,000.00 | |
| City of Chattanooga Bonds, 4½% | 8,000.00 | |
| City of Dallas Bonds, 4½% | 11,000.00 | |
| City of Detroit Bond, 4% | 1,000.00 | |
| City of Newark Bonds, 4% | 6,000.00 | |
| City of Patterson Bond, 4¼% | 1,000.00 | |
| Town of Montclair Bonds, 4¼% | 4,000.00 | |
| Chicago, Milwaukee, St. Paul & Pacific R. R. Co. Bonds, 5% | 200.00 | |
| Total | | $138,100.00 |

*Property:*

| | |
|---|---|
| Lots 3, 4, 5, 16, 17, 801, 802, 806, 807 in Square 62, Washington, D. C., Building and Equipment | $537,795.56 |
| Total | $728,925.57 |

Of the securities listed above, only 1-$1000 bond of the City of Detroit (in Life Membership Fund) has failed to pay interest to the amount of $40.00. As of October 15, 1935, $17,400 Liberty Loan Bonds, 4th issue, 4¼%, were called and were replaced with Treasury Bonds, 2¾%.

The property entry represents the actual cost of the site, the landscaping, the Building, the approach and the equipment, less the mortgage of $36,400 on Lot 7 which it was necessary to purchase in order to acquire the other property required. The mortgage formerly held by the George Washington University at 5½%, has been transferred to the Maryland Trust Company at 4%. The Chairman of the Committee on Maintenance, AMERICAN INSTITUTE OF PHARMACY, will give further details in his report.

The Secretary's report will show receipts from Dues, the JOURNAL, the National Formulary, Recipe Book, YEAR BOOKS, Proceedings, Bulletins, Badges and Bars, Buttons and Pins, and Miscellaneous Items, which are collected by him and deposited in the Secretary's account in the Baltimore National Bank. These receipts are transferred by check, accompanied by itemized deposit slips, to the Association's checking account in the Merchants and Newark Trust Company from which all budget expenses are paid by voucher check.

The report of the Treasurer for the calendar year 1935 was audited by W. Albert Johnson, the auditor approved by the Council, and his report was published in the JOURNAL for April 1936, page 365. The Treasurer's report for 1935 will be published in full later in the JOURNAL.

Respectfully submitted,

CHARLES W. HOLTON, *Treasurer.*

# EDITORIAL NOTES

## GENEVA NARCOTICS CONVENTION.

The International Convention for the Suppression of the Illicit Traffic in Dangerous Drugs which was signed by twenty-seven nations in Geneva, June 26th, will actually weaken present enforcement laws instead of strengthening them, in the opinion of Stuart J. Fuller.

Representative Stuart J. Fuller, refused to sign the document on behalf of the United States and at the time issued a strong statement condemning it. Other representatives of the United States were Harry J. Anslinger, Commissioner of Narcotics, with Frank X. Ward of the Department of State as legal adviser.

"Although the United States could not sign the convention," said Mr. Fuller, "it would continue to extend all possible coöperation to other nations in the campaign against the abuse of narcotic drugs." In his opinion this could be done more effectively under the existing American system than under the limitations the convention would impose.

## NARCOTIC LICENSES.

The Bureau of Narcotics of the Treasury Department advises that under the regulations it is necessary for those who desire to obtain a narcotic license to comply with the state laws. The amendment to the Harrison Act sets up a new class of registration known as Class VI. In this class will fall laboratories of colleges of pharmacy and laboratories of research and analytical workers.

## CENTENARY OF STANDARDS FOR WEIGHTS AND MEASURES.

It was in 1836 that Congress fixed legal standards for weights and measures. For about fifty years action of Congress was delayed until finally, in 1836, Congress adopted the following resolution:

"That the Secretary of the Treasury be, and he hereby is, directed to cause a complete set of all weights and measures adopted as standard and now either made or in progress of manufacture for the use of the several custom houses, and for other purposes, to be delivered to the governor of each State in the Union, or such person as he may appoint, for the use of the States, respectively, to the end that a uniform standard of weights and measures may be established throughout the United States."

## MAGGOT STUDY YIELDS NEW FACTS ON UREA.

A *bulletin* of the U. S. Department of Agriculture, of August 6th, deals with the mystery of how blowfly maggots stimulate healing in stubborn wounds, a fact observed by surgeons during the World War. Dr. William Robinson, of the U. S. Department of Agriculture, now announces the possibility that urea may be responsible along with allantoin for this remarkable healing produced by maggots.

Dr. Robinson has been investigating this subject in the Division of Insects Affecting Man and Animals, Bureau of Entomology and Plant Quarantine. He announced last year the discovery of allantoin in maggot excretions and now finds that urea is present also. Preliminary tests indicate that the pure synthetic chemical by itself induces the same healing as maggots or allantoin. These preliminary observations must be supplemented by additional clinical tests and this is outside the scope of the Department's investigations. In the treatment of wounds, urea has been used mostly as a two per cent solution; but, unlike allantoin, it is highly soluble.

Attention was called to the healing possibilities of urea not only because it was associated with allantoin in maggot excretions, but also because the chemical "picture" of allantoin shows how easily its side chain might be "chipped" off by hydrolysis to form urea. It has been suggested that this "chipping" may occur when allantoin is used in wounds, leaving urea as an active agent in healing.

## TERCENTENARY OF NETHERLAND PHARMACOPŒIA.

Dutch pharmacists are celebrating the three hundredth anniversary of the coming into force of the Amsterdam Pharmacopœia. Issued in 1636, this was made obligatory for all physicians and pharmacists throughout the country. Prior to that date there had been no uniformity among the many formularies in use, the most generally used and esteemed among which was the "Dispensatorium" of Valerius Cordus. Although the names of the collaborators are not mentioned in the work itself, contempo-

rary documents amply prove that the Amsterdam Pharmacopœia, approved by the College of Physicians and Pharmacists, was essentially the work of Nicholas Tulp. The preface, *inter alia*, draws the attention of the authorities to the advantages to public health of this work of unification, due to the collaboration of physicians and pharmacists. As was usual with scientific works of that period, the first Netherlands Pharmacopœia was printed entirely in Latin.

## RETIREMENT OF PROFESSOR L. VAN ITALLIE.

On July 1st, Professor Leopold van Itallie, who has been an honorary member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1923, gave his farewell lecture at Leiden University. Dr. van Itallie has been professor of Pharmacy and Toxicology in the University for twenty-nine years. In the course of an appreciation by Dr. A. J. Steenhauer in the *Pharmaceutische Weekblad*, reference is made to his success as a teacher and to the esteem in which he is held by all past and present students who have passed through his hands at Leiden. Dr. Steenhauer recalls the remarkable energy with which he has carried out his duties even since his silver jubilee four years ago. In addition to routine work as professor, Dr. van Itallie has taken a prominent part in the investigation, under the auspices of the League of Nations, of methods for the assay of opium toxicology and phytochemistry. The work for thirty-five years on the Pro-Pharmacopœia Commission he passed on to others on the publication of the first supplement to the Netherlands Pharmacopœia in 1934. This great work for pharmacy has been recognized by the conferment of honorary degrees by the Universities of Paris and Liége. Professor van Itallie's interest in poisons was shown in his choice of subject—"The Growth of Toxicology," for his farewell lecture. At the conclusion of the address a bronze plaque was presented to the professor by past and present students, and this is to be placed in the pharmaceutical laboratory of the University.—Abstracted from the *Chemist and Druggist*.

## A. PH. A. MEMBERSHIP PRIZES.

Dean Teeters' prize of membership in the AMERICAN PHARMACEUTICAL ASSOCIATION for recognition and description of crude drugs was awarded to Ben M. Cooper, Davenport, a member of the graduating class.

Gail A. Wiese, Anita, was the winner of the Gus Scherling prize for the highest rank in organic chemistry and Professor Cooper's prize for highest rank in operative and manufacturing pharmacy. Both prizes are memberships in the ASSOCIATION, so Mr. Wiese's membership will be taken care of for two years.

Marjorie L. Moburg, Geneseo, Illinois, won Professor Kuever's prize for excellence in operative pharmacy. This is a year's subscription to the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

**Dr. Glenn L. Jenkins,** for several years member of the faculty of the School of Pharmacy, University of Maryland, has accepted a position as professor and head of the Department of Pharmacy, University of Minnesota.

**Walter H. Cousins,** *Southern Pharmaceutical Journal*, came into new honor recently when he was elected president of the Old Timers Cowboy Reunion Association. In recognition of his services as vice-president and historian over a period of years, Mr. Cousins was presented with a beautiful strawberry roan horse. He was a pet horse of T-5 ranch at Throckmorton and "fit for a king," the owner says.

Miss Margaret Cousins and her father are actively participating in the local program.

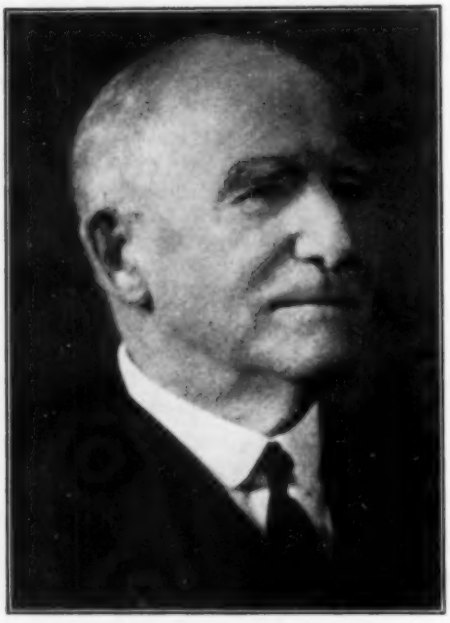
## SESQUICENTENNIAL OF THE DEATH OF CARL WILHELM SCHEELE.

C. L. Leonard quotes from an article in *Farm. Revy* for May 30, 1936, in which an account is given of a ceremony held at Köping, Sweden, on May 31, 1936, in memory of the 150th anniversary of the death of Carl Wilhelm Scheele. The affair was under the auspices of the city of Köping and the Apothecaries Society. Noted Swedish scientists and guest pharmacists from Berlin, Vienna, Stettin, Oslo and Copenhagen were present. Wreaths were placed on Scheele's grave in the church-yard; then the party adjourned to the church where a song, of a previous occasion—the unveiling of Carl Milles' statue of Scheele in 1912—was sung and addresses were heard. Apothecary S. Gullström reviewed the outstanding points of Scheele's life and his contributions to science. The foreign guests were welcomed and replied, after which the governor of the province spoke for the Swedish state.

## OBITUARY.

### SIR HENRY WELLCOME.

Henry Solomon Wellcome, member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1875, and *Honorary President*, 1931–1932, died in London on July 25th, in his 83rd year, following an operation. Born in 1853 in a log cabin near Almond, Wisconsin, about 125 miles from Milwaukee, he was the son of an itinerant missionary, the Rev. S. C. Wellcome, who with his wife, Mary Curtis Wellcome, traveled in a covered wagon in Wisconsin and Minnesota and preached among the Indian settlements. He attended the schools of the



SIR HENRY WELLCOME.

frontier. As a youth, in Minnesota, he was in the midst of the Sioux Indian War and was made a captain of the boys whose duty it was to cast rifle bullets. He assisted his uncle, Dr. J. W. B. Wellcome, in dressing wounds of the Minnesota pioneers.

At an early age he began his career as a pharmacist in Rochester, Minn., where he worked from 1868 to 1871. It was there he came under notice of Dr. William Worall Mayo, to whom he paid public tribute, in 1835, when he said that he owed whatever success he had attained in this world to him.

The senior Dr. Mayo encouraged him to study pharmacy and later arranged for his matriculation at the Chicago College of Pharmacy. During his attendance the Chicago Fire destroyed the college, and he then enrolled at the Philadelphia College of Pharmacy, and graduated in the class of 1874, where he was a classmate of Frederick Power. Following his graduation Mr. Wellcome was associated with Caswell Hazard & Co., of New York, and then with McKesson & Robbins. In the latter connection he was sent on special missions to various parts of North and South America; he studied the native cinchona forests and on his return contributed articles on the results of his observations.

In 1880 Mr. Wellcome left New York for London. With his friend, S. M. Burroughs, who represented John Wyeth & Bro., he discussed the advisability of chemical and pharmaceutical manufacturing with the result that Burroughs Wellcome & Co. was established. Mr. Burroughs died in 1895 and since that time Mr. Wellcome has served as the head of the firm and governing director of the Wellcome foundation.

For more than sixty years the deceased took an active interest in the AMERICAN PHARMACEUTICAL ASSOCIATION; he was present at the ground-breaking for the Headquarters, and, later, at the dedication of the new building in May 1934. During that week he was awarded the Remington Honor Medal.

He became a naturalized British subject in 1910. For many years it was his custom to spend a part of each year in Washington, where he was a member of the Cosmos Club, the National Geographic Society, the Archæological Society of Washington and the Minnesota Historical Society of the District of Columbia. He also was an honorary member of the American Society of Tropical Medicine and an honorary member of the Association of Military Surgeons of the United States.

As a result of his experience and interest in tropical research, Secretary of War, the Hon. J. M. Dickinson, appointed him to visit Panama and make a survey of sanitary conditions and methods of operation in all sections of the Canal Zone, and to submit an unbiased report based on his personal observations. The report of Sir Henry's survey secured a free hand for General Gorgas in continuing his monumental sanitary work in Panama.

He was one of the sponsors and a director of the Gorgas Memorial Institute of Tropical and Preventive Medicine in Washington, operating scientific laboratories at Panama for research

work touching causes and prevention of tropical diseases.

On one of his expeditions to the Sudan he discovered several prehistoric Ethiopian archæological sites in the Upper Nile Region. Excavations here were carried out under his personal direction, including the supervision of a technical and administrative staff of 25 Europeans and more than 3000 native workmen. Professor G. A. Reisner, of Harvard University, writing of these researches said: "The Excavations carried on by H. S. Wellcome have thrown unexpected light on early Ethiopian history in this region. For the first time, a scientific archæological record has been made of a site in the interior of Africa."

As an energetic and public-spirited man, Sir Henry held memberships in numerous medical, archæological, geographic and similar societies. He also received many honorary degrees in recognition of his scientific achievements and public benefactions.

In 1932 he was knighted by King George for his services to medicine and pharmaceutical development.

He was a man of great versatility and of wide outlook; he contributed much to the advance of tropical medicine; he was an anthropologist, a field archæologist, a buyer of books, and a collector on a large scale. The Wellcome Medical Museum was perhaps nearest to his heart in these connections. It is a wonderful collection of anthropology, pharmaceutical subjects, medical appliances, coins, pictures, statuary and books.

A biographical sketch was published in the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION for April 1934, pages 285 and 286, and therein are other references to the activities of the deceased.

A list of honors, memberships, degrees and appointments, comprising about 30 titles, indicate the wide recognition of Sir Henry's services to the world, the sciences and professions by various countries, scientific and professional bodies, societies and universities. Some of the foregoing are included in the sketch and in the publications to which reference has been made.

Personally Sir Henry was a quiet, reticent and almost shy man; he quickly brightened up when he became interested in some topic of conversation. He married a daughter of Dr. Bernardo, the founder of Bernardo Homes.

Other articles relating to the deceased will appear; he is still too near for appraisal of his contributions and services.

## DEATH OF REPRESENTATIVE JOHN J. McSWAIN.

John J. McSwain, Chairman of the House Military Affairs Committee, died August 6th, in a Veteran Hospital, Columbia, S. C. Representative McSwain did not seek reëlection on account of health conditions. Born at Cross Hill, Laurence County, South Carolina, May 1, 1875, he spent his childhood on his father's farm and attended country schools. He was graduated from South Carolina College in 1897, and was admitted to the bar and began practicing law at Greenville in 1901. At the outbreak of the War, he entered service and won his commission as a captain in the 154th Infantry, commanding Company A of that regiment through the War. Discharged in 1919, he returned to the practice of law in Greenville until he was elected to Congress in 1920. He was a student of history and was author of a book, "The Causes of Secession."

The Congressman was appointed member of the House Military Affairs Committee and had been Chairman for about six years. He was helpful in carrying to enactment S. 4390, commissioning pharmacists in the Army Medical Service. Representative McSwain was best known as an advocate of Army expansion and especially development of a large Army Air Corps. He is remembered by pharmacists for his part in the recent legislation.

A. L. Judisch, Muscatine, a brother of **George Judisch,** died June 23rd at his home in Muscatine, Iowa, aged 77 years. Mr. Judisch, a mechanic by trade, had been a partner with George Judisch in the Ames Drug Store since 1894.

## PHILIP I. HEUISLER.

Just before closing this issue of the JOURNAL, we are advised that Philip I. Heuisler, chairman of the board of directors of the Emerson Drug Company, died unexpectedly August 17th, in Franconia, N. H., where he had gone two weeks ago for a rest.

With him were his wife, Mrs. Marie Gardiner Heuisler, and a daughter, Miss Katharine Heuisler, who had accompanied him to the resort. He was 65 years old.

Mr. Heuisler, when he died, also was president of the Maryland Glass Corporation. He was a past-president of the Glass Containers' Association of America. He was affiliated with the AMERICAN PHARMACEUTICAL ASSOCIATION in 1903.

# BOOK NOTICES.

## SECOND EDITION OF THE PHARMACEUTICAL RECIPE BOOK.

It is hoped to have the second edition of the Pharmaceutical Recipe Book on sale about October 1st. As a matter of interest the Chapters are named and most of the titles are listed. Nearly all of the formulas have been tried out.

**I. Pharmaceutical Formulas:** Ampuls, Balsams, Baths, Capsules, Cerates, Collodions, Confections, Cordials, Creams—Medicinal, Decoctions, Drops, Effervescent Salts, Electuaries, Elixirs, Emulsions, Enemas, Extracts, Fluidextracts, Gargles, Gelatins, Glycerites, Glycerogelatins, Infusions, Inhalants, Injections, Jellies, Liniments, Lotions, Eye Lotions, Lubricants, Magmas, Mixtures, Mucilages, Oils, Ointments, Oleates, Paints, Pastes, Petroxylins, Pills, Plasters, Plugs, Poultices, Powders, Powders—Douche, Powders—Dusting, Powders—Foot, Powders—Sternutatory, Powders—Miscellaneous, Soaps, Solutions, Spirits, Sprays, Suppositories, Suspensions, Syrups, Tablets, Sweet Tablets, Teas, Tinctures, Troches, Vinegars, Washes, Waters, Wines, Miscellaneous Pharmaceutical Preparations, Vehicles.

**II. Flavoring Extracts:** Imitation Extracts and Flavors, Flavoring Powders and Pastes.

**III. Dental Formulas:** Tooth Pastes, Tooth Powders, Mouth Washes, Miscellaneous Dental Preparations.

**IV. Chiropodist Formulas.**

**V. Veterinary Formulas:** Preparations for Birds, Preparations for Cattle, Preparations for Dogs, Preparations for Horses, Preparations for Poultry.

**VI. Cosmetic Formulas:** Bath Salts, Brilliantines, Camphor Preparations, Cleansing Preparations, Deodorants, Depilatories, Face Powders, Face Powders—Liquid, Hair Lotions, Lip Preparations, Nail Preparations, Pomades, Rouges, Shampoos, Shaving Preparations, Skin Creams: (*a*), Vanishing or Non-Greasy Creams; Powder Base Creams; (*b*), Rolling or Massage Creams; (*c*), Toilet Creams, Smelling Salts, Talcum Powders, Toilet Lotions, Toilet and Cosmetic Waters, Miscellaneous Cosmetic Preparations.

**VII. Photographic Formulas:** Developers, Hardening and Fixing Baths, Intensifiers, Reducing Solutions, Miscellaneous.

**VIII. Laboratory Reagents:** Reagents for Examination of Urine, Reagents for Examination of Phenols, Reagents for Examination of Kidney Functions, Reagents for Examination of Gastric Contents, Reagents for Examination of Blood for Calcium etc., Miscellaneous Reagents.

**IX. Technical and Miscellaneous Formulas:** Cements, Cleansing Accessories, Colors for Show Globes, Fumigators, Incenses, Inks, Insecticides, Moth Preparations, Odorizers, Paints and Lacquers, Polishes, Stains, Stain Removers, Miscellaneous, Anti-Freezing Solutions for Automobile Radiators, Factory First-Aid Outfits.

**X. Doses.**

**XI. Schedule of Antidotes for Poisons.**

**XII. Table of Solubilities.**

The Book will be distributed by Mack Printing Company, Easton, Pa. Publishers, AMERICAN PHARMACEUTICAL ASSOCIATION, 2215 Constitution Ave., Washington, D. C. Price $5.00.

The third edition of the *Directorio Medico Mexicano* (Mexican Medical Directory) is just off the press. It contains besides up-to-date lists of physicians, dentists, veterinary surgeons, midwives, druggists, hospitals and laboratories of the Republic of Mexico, useful data concerning the schools of medicine, the medical societies, the organization of public charities, and also a series of articles by prominent medical men on the "Progress of Medicine in Mexico." The book is well printed and well bound and would be of interest to manufacturers desiring to export products to Mexico or anyone looking for timely information of the organization of the medical profession in that country. The price per copy is $2.50. U. S. orders may be sent direct to the Publishers of the Directorio Medico Mexicano, Apartado 2105, Mexico City.

## BOOKS RECEIVED.

"Parenteral Therapy; A Ready Reference Manual of Extra-Oral Medication," by DUTTON and LAKE. The Keybook to the Injection of Drugs, both with and without the needle, including Ionic Medication, Epidermal and Topical Applications. Charles C. Thomas, Springfield, Ill., and Baltimore, Md., publisher. Price $7.50 postpaid.

"Disinfection and Sterilization," by ERNEST C. MCCULLOCH, M.D., D.V.M., Ph.D., Biological Research Department, Pennsylvania Salt Manufacturing Company; formerly Pro-

fessor of Bacteriology, Alabama Polytechnic Institute, Auburn, Alabama. Formerly Supervisor of Milk Control, Division of Health, City of St. Louis. Octavo, 525 pages, illustrated with 53 engravings. Cloth, $5.50, net. Published 1936 by Lea and Febiger, Philadelphia, Pa.

"Annual Survey of American Chemistry, Volume X, by the Associates of the National Research Council." Price $5.00. Published by Reinhold Publishing Corporation, 330 W. 42nd St., New York City.

"Underhill Toxicology," 3rd edition; 325 pages. Washable Cloth Covers, $2.50. By FRANK P. UNDERHILL, Ph.D. (Yale). Thoroughly revised by Theodore Koppanyi, Ph.D., Professor of Pharmacology and Materia Medica, Georgetown University Medical School. Published by P. Blakiston's Son & Co., Inc., 1012 Walnut St., Philadelphia, Pa.

"The Harvey Lectures," delivered under the auspices of The Harvey Society of New York, 1934–1935. Under the patronage of the New York Academy of Medicine. Price $4.00. Published by The Williams & Wilkins Co., Baltimore, Md.

"Formulary of the University Hospital," University of Michigan, 1934. By HARVEY A. K. WHITNEY, Chief Pharmacist, Ann Arbor, Michigan. Published by Edwards Brothers, Inc., Ann Arbor, Michigan.

"Chinese Medicinal Plants," from the Pen Tsao Kang Mu, Third edition, 1936, by BERNARD E. READ. Published by the Peking Natural History Bulletin.

"Chinese Materia Medica," Animal Drugs, by BERNARD E. READ. Published by the Peking Natural History Bulletin, Sales Agent, The French Bookstore, Hotel de Pekin, Peiping, China. Price $3.00.

"Chinese Materia Medica," Avian Drugs, by BERNARD E. READ. Reprinted from Peking Natural History Bulletin. Volume 6, Part IV, pp. 1–112.

"Records of the Malaria Survey of India." Published under the authority of The Indian Research Fund Association. Editor: Lieut. Colonel J. A. Sinton, Director, Malaria Survey of India. Assistant Editor: Major H. W. Mulligan, Assistant Director, Malaria Survey of India. Published for the Indian Research Fund Association by Thacker's Press and Directories, Ltd., Calcutta.

"Oppenheimer—Die Fermente," Parts I–IV. Supplement will be complete in about 10 parts. Each part will be sold at $6.80. Publisher, W. Junk Verlag. The Hague, Holland.

"Anæsthetica," reprints of *Weekblad* 1933–1935 by C. OFFERHAUS and C. G. BAERT. Publisher, D. B. Centen, Amsterdam, Holland.

"Handbuch der Pharmackognosie," second enlarged edition, 18th part, by A. TSCHIRCH. Verlag of Bernard Tauchoritz, Leipzig.

"Leitfaden für die Pharmakotnostichen Untersuchungen in Unterricht und in der Praxis," by PROFESSOR DR. R. WASICKY, with coöperation of DR. ROBERT FÖCHER, INNSBRUCK; DR. LEOPOLD FUCHS, Vienna; DR. ROBERT JARETZKY, Braunschweig; DR. LUDWIG KOFLER, Innsbruck; DR. H. LEONHARDT, Frankfurt; DR. AD. MAYRHOFER and DR. R. WASICKY, Vienna. Part I, II. Price M. 24. Published by Franz Deuticke, Leipzig and Vienna.

"Vitamine und Hormone und Ihre Technische Darstellung," by DR. HELLMUT BREDERECK, University of Leipzig. Verlag von S. Hirzel, Leipzig. Price R.M. 6. Second volume is to appear later.

## ASSOCIATIONS.

### TENNESSEE PHARMACEUTICAL ASSOCIATION.

The following were elected officers of Tennessee Pharmaceutical Association: *President*, P. P. Vance, Chattanooga; *First Vice-President*, William P. Winter, Nashville; *Second Vice-President*, R. D. Hutchinson, Memphis; *Third Vice-President*, H. B. Moseley, Knoxville; *Treasurer*, H. J. Berryhill, Jackson; *Secretary*, J. B. Sand, Nashville. Chattanooga was selected for the 1937 convention.

Dr. B. L. Fuqua, director of the Tennessee Food and Drug Department, was a speaker at the Tennessee Pharmaceutical Association meeting held in Nashville. He stressed the point that the law should be amended. Dr. O. N. Bryan of Nashville, spoke on the "Relationship of Pharmacy and Medicine." Alfred T. Levine, general counsel for the Association, stated that legislative individuality and public opinion are essential.

### OREGON ASSOCIATION.

Oregon Pharmaceutical Association elected the following officers for the ensuing year: *President*, M. C. Kaegi, Portland; *Vice-President*, A. S. Kier, Hood River; *Treasurer*, E. A. Bachman, Portland; *Secretary*, L. Stovall, Maupin.

New members, *Board of Directors:* E. E. Koch, Tillamook; John F. Allen, Corvallis; R. E. Legg, Salem and Frank Nau, Portland. Others constituting the *Board of Directors* include: Harry Cohon, Portland; M. C. Kaegi, Portland; E. A. Bachman, Portland; A. S. Kier, Hood River; F. G. Mitchell, Hillsboro; F. O. Berg, Astoria; F. A. Hand, Eugene and Lawrence Stovall, Maupin.

## PITTSBURGH GRADUATE CHAPTER, KAPPA PSI.

The Pittsburgh Graduate Chapter of Kappa Psi National Pharmaceutical Fraternity held their regular monthly meeting, dinner and initiation at the Highland Country Club, West View, Pa., July 16th.

After the golf tournament, dinner was served in the club house dining room. The initiation of eighteen candidates was held on the flagstaff hill as the sun was setting. The evening was occupied in social affairs.—F. J. Steele, *Historian.*

The following are officers and charter members of the new Graduate Chapter: C. E. Rickard, Dormont, *Regent;* W. J. Hill, Pittsburgh, *Vice-Regent;* E. Reeves, Avalon, *Secretary;* H. A. Krumpe, Gibsonia, *Treasurer;* J. M. Wible, Apollo, *Chaplain;* F. J. Steele, Pittsburgh, *Historian;* C. Schaefer, Pittsburgh, *Chairman* of the By-Laws Committee; Dr. L. K. Darbaker, Wilkinsburg; R. Taylor, Greensburg; E. Claus, Pittsburgh; G. Young, McKeesport; W. Siegel, Erie; R. Miller, Pittsburgh.

## MONTANA DRUG RESALE LAW IS RULED INVALID.

The Montana Supreme Court recently declared unconstitutional the state statute which prohibits the sale of drugs and medicines in the manufacturer's original package by any persons other than licensed druggists and pharmacists. Whether or not the law was a valid exercise of the police power of the state was the question. The ruling of the court reversed the decision of the Yellowstone District Court and dismissed a complaint against I. W. Stephens, Billings' grocer.

## GREEN RIVER ORDINANCE HELD VALID.

The Wyoming Supreme Court, in a decision handed down in June, held the Green River anti-peddling ordinance valid even to the extent that it was declared to be a violation for a person to call on housewives in Green River to "solicit an invitation" to call and show his merchandise.

The Court said: "The ordinance in question is intended to suppress acts having a tendency to annoy, disturb and inconvenience people in their homes. The annoyance to the home-occupant occurs when he is disturbed by the intrusion of the class of persons described. The ordinance does not apply to all uninvited visitors, but only (so far as now material) to those whose purpose is to solicit orders for the sale of goods. To warrant a conviction the evidence must be sufficient to show the entry for the stated purpose, but it need not show an actual solicitation of orders. We should not give the ordinance a construction that will permit solicitors to create the annoyance by entering homes for the purpose of soliciting orders, and then evade the penalty by showing that all they asked for in the beginning was an invitation to solicit orders. The solicitation of the invitation was not a purpose in itself, but a step in carrying out the purpose to solicit orders."

---

Canadian Pharmaceutical Association will meet at Saskatoon, Sask., August 17th to 20th. Official Headquarters, "The Bessborough."

**Robert L. Crowe** has been appointed Dean of the University of Tennessee School of Pharmacy, succeeding Dr. O. W. Hyman, dean of the College of Medicine, who has been acting dean of the School of Pharmacy for three years.

**Sir Henry Wellcome,** who had a warm spot in his heart for Wisconsin, was the holder of the first certificate for outstanding service in pharmacy awarded by the Wisconsin Pharmaceutical Association in 1935. In 1933, he was presented a trophy for outstanding service by organized pharmacy in Milwaukee

Officers of the Wisconsin Pharmaceutical Association have indicated that they are anxious to abide by the wishes of Sir Henry in cooperating in the establishment of a memorial at his birthplace as he had planned.

The Esperanto Association of North America met at Detroit on July 2nd. The discussions were conducted in Esperanto. President J. I. Scherer declared that there are 4,000,000 Esperantists in the world. It was the conviction of the convention that alone through a universal language will the masses of all the peoples be able to communicate clearly. One of the aims of the society is to introduce Esperanto in the schools.